TECHNOLOGY DEPT.

JANUARY 15, 1959
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V. 63 #2

TELEPHONE ENGINEER & MANAGEMENT

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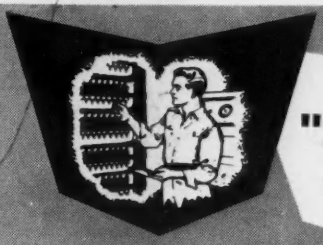

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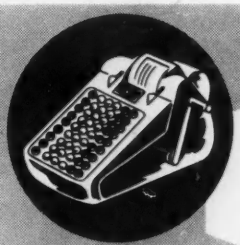

ACCOUNTING NOTES
by G. M. JONES

See Page 50

PLANT NOTES ON NEW DEVELOPMENTS
by JOHN S. REED

See Page 54

1 out of 13

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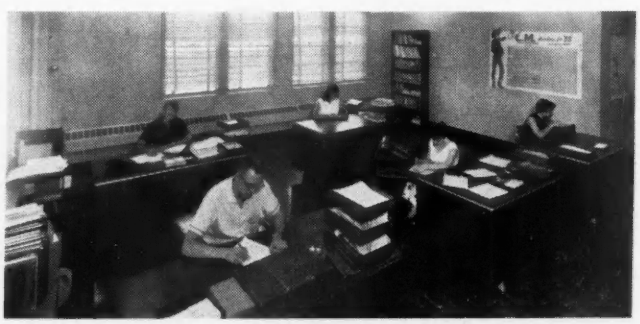

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TELEPHONE ENGINEER & MANAGEMENT

the telephone industry magazine

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FRONT COVER

The front cover of this issue of TELEPHONE ENGINEER & MANAGEMENT tells its own story by presenting a prevue of the new features TE&M is bringing its readers during its "50th Anniversary Year." For a complete rundown on the good things we have planned for all TE&M readers, see pages 4 and 5 of the January 1 issue. You'll find many of the new "every-issue" features in this issue . . . Hope you like them.

Volume 63, No. 2. Published on the 1st and 15th of each month by TELEPHONE ENGINEER PUBLISHING CORP., 7720 Sheridan Road, Chicago 26, Ill. Telephone — Rogers Park 4-3040.

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POSTMASTER . . . Please send form 3579 to TELEPHONE ENGINEER & MANAGEMENT, 7720 N. Sheridan Rd., Chicago 26, Ill.

Nearby Kellogg Supplies help restore service after devastating Iowa tornadoes

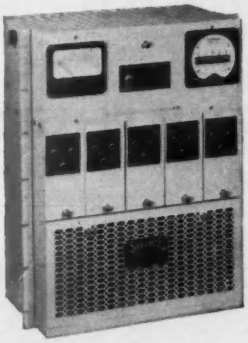
Thanks to close-at-hand supplies from Kellogg, La Porte, Iowa's telephone service was rapidly restored after heavy tornado damage in late spring. Close cooperation between M. W. Wagner, manager of La Porte's telephone company and the Kellogg regional warehouse in Kansas City, Kansas put 750 telephones back in service within ten days although miles of line were down throughout the area. True to the traditions of the telephone industry, more fortunate neighboring companies sent emergency service personnel into La Porte to help with restoration.

La Porte's disaster is typical of that faced each year by hundreds of independent companies throughout the country. In all cases, and at all times, the regional Kellogg warehouse stands ready to be of service, as with La Porte.

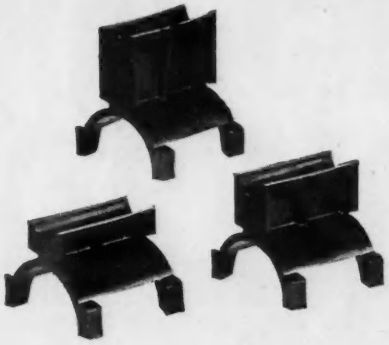
Completely stocked and equipped, you'll find your Kellogg warehouse the ideal place to fill your supply needs, regardless of how large or small your requirements may be.

Kellogg Switchboard and Supply Company, 6650 South Cicero Avenue, Chicago 38, Ill. Communications Division of International Telephone and Telegraph Corporation.

KELLOGG
CHICAGO, ILLINOIS
Communications Division of
IT&T

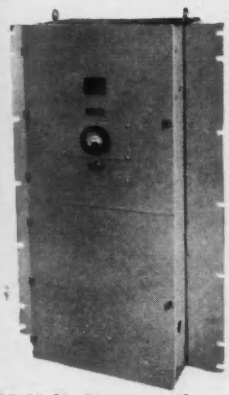


Transistor Sub-Cycle—Operates directly from 50-volt exchange battery for regular or stand-by service. No expendable or moving parts—Stabilized ringing frequencies—Regulated ringing voltages—Sine wave output—Capacity 0.200 amp per ringing frequency—Available for Harmonic, Synchromonic, and Decimonic Ringing. LORAIN PRODUCTS CORPORATION.

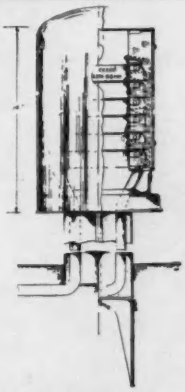


Form Fitting Lead and Plastic Cable Spacers used in lashed cable construction at poles and splices, provides separation between cable and strand. Easy to use with any size cables. Made by O. F. KINSEL & SONS.

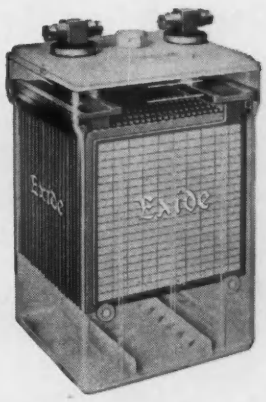
Patented method of interspersing abrasive particles throughout the inner surfaces of Reliable Squeez Sleeves ensures holding ability and high electrical efficiency. Made of alloy steel with combinations of standard die grooves, they operate efficiently and provide long life without adjustment. RELIABLE ELECTRIC COMPANY.



New 48-Volt Battery Charger Line. Completely redesigned Raytheon Recti-Chargers (R) feature no load to full load regulation of ±1%, no tubes, automatic compensation for rectifier aging, no audible hum. Most compact units on the market—single and three phase, output from 3 to 400 amperes. RAYTHEON MANUFACTURING COMPANY.



CEECO LUG-12 Pedestal Parkway Terminal — for direct buried wire or plastic cable. Two-piece pedestals, 6' long; brackets available for pole mounting. Accessible for testing, splicing, cross connecting, buried wire distribution. All-steel construction. Side plates give nominal air gap protection at stud ends. Type C637 Loading Coils used on CEECO Type 177 R.D.W. Terminals are interchangeable in both terminals. COMMUNICATION EQUIPMENT & ENGINEERING COMPANY.



Big Capacity in Small Size. Unique positive plate in Exide-Tytex Battery has large area of active material that results in high capacity. Exclusive patented Silvium grid resists corrosion — prolongs battery life. Taperless plastic jars save one-third space. Exide Industrial Division, THE ELECTRIC STORAGE BATTERY COMPANY.

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OXford 7-5780. TWX SAN MATEO CAL 06

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ILLINOIS
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KANSAS
7th & Sunshine Road, Kansas City 15, Kansas
MAyfair 1-4418. TWX KC KAN 1055

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West 9-6715. TWX MP 1195

NEW YORK
327 North West Street, Syracuse, N.Y.
HArrison 2-9251

OHIO
1555 West Fourth Street, Mansfield, Ohio
LAfayette 4-6511. TWX MANS O 132

TEXAS
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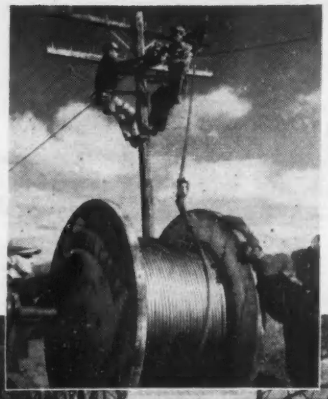
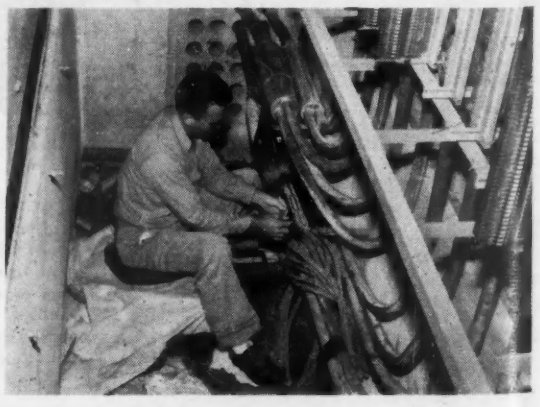
EXPORT
157 Prospect Street, Passaic, N. J.
PRescott 3-5100

This Cook Stranterm is available in 6, 11, and 16 pair. The only strand-mounted Cable Terminal designed for a flexible system of Minigap or Mytigap protection. Supplied with either plastic or lead sheathed cable stub.
COOK ELECTRIC COMPANY.

Longer spans, lower costs. Crapo HTL-195, the new extra high tensile, lower resistance telephone line wire makes possible up to 40% reduction in pole structures with marked savings in construction costs. Developed and manufactured by INDIANA STEEL & WIRE COMPANY, INC.



WHY LOOK FURTHER?



PAIR SIZES

26 Ga. 11 through 2121 pairs
24 Ga. 11 through 1515 pairs
22 Ga. 6 through 909 pairs
19 Ga. 6 through 455 pairs

CORE TYPES

Pairs—Unit Construction
Pairs—Layer Construction
Quads
Star Quads
Video Pairs
Combinations

SHEATHS

1% Antimony Lead and any of the following protective coverings:

polyethylene, neoprene, jute — for corrosion and electrolysis resistance

single steel tape armor	light mechanical protection (gopher protected)
double steel tape armor	heavy mechanical protection and magnetic shielding
steel wire armor	submarine installations and maximum mechanical protection

GENERAL CABLE MAKES ALL TYPES AND SIZES OF PAPER LEAD TELEPHONE CABLE

FOR EVERY KIND OF SERVICE!

General Cable is the one source for every telephone cable need, whether standard or special. Paper lead constructions, the standards of the telephone industry, are manufactured in four telephone plants in locations that assure fast, efficient service throughout the country.

Over 75 years of experience with paper lead telephone cable, broad engineering and research facilities and services, and the most modern manufacturing and quality control equipment assure you of cables that meet the highest standards of performance and physical and electrical uniformity. Unusual or special constructions may be designed and manufactured when desired.

Backing up its distributors, General Cable has large stocks of all types and sizes of paper lead cable in easily accessible Distributing Centers all over the country. Telephone Specialists in General Cable offices provide expert technical assistance on your wire and cable problems. Our new 52 page catalog covering all standard General Cable paper lead constructions is available through your Leich or Automatic Electric representative.

GENERAL CABLE CORPORATION, 420 Lexington Avenue, New York 17, N. Y.
Offices and Distributing Centers Coast-to-Coast

Distributed by: AUTOMATIC ELECTRIC SALES CORP., Northlake, Illinois • LEICH SALES CORP., 427 W. Randolph St., Chicago 6, Illinois

for quality and service... **specify GENERAL CABLE**

Fits You

LEICH

Subsidiary of GENERAL TELEPHONE

Like a Glove

Did you ever go into a hat store with your wife? No matter where you go, the clerk always seems to say, "Darling, I've *just* the hat for you."

Well friend, we are not about to call you "darling," but it might interest you to know that we have just the supply service to fit your needs. If you're big, we are pleased to say that we serve the biggest telephone companies in the United States. If you're small, or medium sized, you might like to know that many small and medium sized telephone companies rely upon us and say that we're the greatest.

We carry everything a telephone company needs. Our tools and materials are the very highest quality, are made by manufacturers long experienced in serving the demanding needs of the independent industry. Our five well-stocked warehouses are manned by experienced people who will do their level best to give you better, more personal service than you have ever received before.

Say . . . we've done a lot of bragging. Why not ask us to prove it?

LEICH SALES CORPORATION • 427 WEST RANDOLPH STREET • CHICAGO 6, ILLINOIS

PACIFIC COAST: 11401 WEST PICO BLVD., LOS ANGELES 64, CAL. SOUTHWEST: 1227 SLOCUM ST., DALLAS 7, TEX. SOUTHEAST: 5126 SOUTH LOIS ST., TAMPA 11, FLA.

manufacturers of telephones, switchboards and related apparatus since 1907

New Kellogg K-31 Carrier System

Ideal for Rural Subscribers

Kellogg's new K-31 rural subscriber carrier system provides telephone companies with toll quality subscriber carrier at low cost. The system is completely transistorized, features printed circuits, miniaturized sub-assemblies and plug-in construction.

Standby power, consisting of two small batteries and a transistorized charger in a pole-mounted housing, is available. This is possible because power consumption is less than three watts even during talking.

K-31 has built-in compandors to assure quiet talking circuits and is automatically regulated to eliminate the effect of changing weather conditions over a wide range of carrier line losses.

Line-up and test procedure is very simple—a single level control for each direction of transmission. Terminating telephone type jacks are provided for ease and speed in testing. Installation time is held to a minimum by the use of a unique pole-mounted housing with built-in protected terminal blocks for external connections.

These design features plus top quality components and workmanship make K-31 reliable and stable in its operation.

Ask your Kellogg sales representative for full details.

KELLOGG Communications Division of IT&T
CHICAGO, ILLINOIS

Kellogg Switchboard and Supply Company, 6650 South Cicero Avenue, Chicago 38, Illinois. Communications Division of International Telephone and Telegraph Corporation.

Regional Offices and Warehouses: See two-page Kellogg advertisement pages 62-63 for complete listing.

coming

CONVENTIONS

LOUISIANA Telephone Association, Jung Hotel, New Orleans, Feb. 3-5, 1959.

MINNESOTA Telephone Association, Leamington Hotel, Minneapolis, Feb. 15-18, 1959.

TEXAS Telephone Association, Hilton Hotel, San Antonio, March 2-4, 1959.

KENTUCKY Telephone Association, Phoenix Hotel, Lexington, March 3, 1959.

IOWA Telephone Association, Hotel Fort Des Moines, Des Moines, April 7-8, 1959.

OHIO Telephone Association, Deshler Hilton Hotel, Columbus, April 13-15, 1959.

ILLINOIS Telephone Association, Hotel Pere Marquette, Peoria, April 20-21, 1959.

NEBRASKA Telephone Association, Hotel Cornhusker, Lincoln, Apr. 21-22, 1959.

INDIANA Telephone Association, Claypool Hotel, Indianapolis, Ind., May 6-7, 1959.

WISCONSIN Telephone Association, Plankington House, Milwaukee, May 13-14, 1959.

KANSAS - MISSOURI Telephone Association, Continental Hotel, Kansas City, Mo., May 25-26, 1959.

PENNSYLVANIA Telephone Association, Buck Hill Falls Inn, Buck Hill Falls, June 1-3, 1959.

CALIFORNIA Telephone Association, Ambassador Hotel, Los Angeles, June 3-5, 1959.

WASHINGTON-OREGON Telephone Association, Olympic Hotel, Seattle, Washington, June 11-12, 1959.

NEW YORK Telephone Association, Scaroon Manor, Schroon Lake, June 15-17, 1959.

Why the **RED HOOK TELEPHONE CO.** ...along with thousands of Independents all over America...prefer **SHERRON STEEL BOOTHS**

John Troy, general manager of Red Hook, thinks straight and buys the same way. He's too close to his firm's New York state operation to be a soft touch for a hard sell. When he buys telephone booths, he has to be sure he's getting the most for his money in booths that will make the most money for his company. In choosing Sherron steel booths exclusively, he knows he is getting booths of proved performance. He knows there's nothing to equal Sherron steel booths in durability. Nothing to compare to them in lasting good looks. Nothing that matches them in care-free serviceability . . . The Sherron Model 17S-Type 2 outdoor booth shown here is located at Tivoli, N. Y., adjacent to Highway U. S. 9G, providing 24-hour service for travelers and residents alike. One of a number of Red Hook Telephone Company installations of Sherron steel booths.

There's a Sherron booth for every location and budget in either zinc coated, cold rolled or stainless steel.

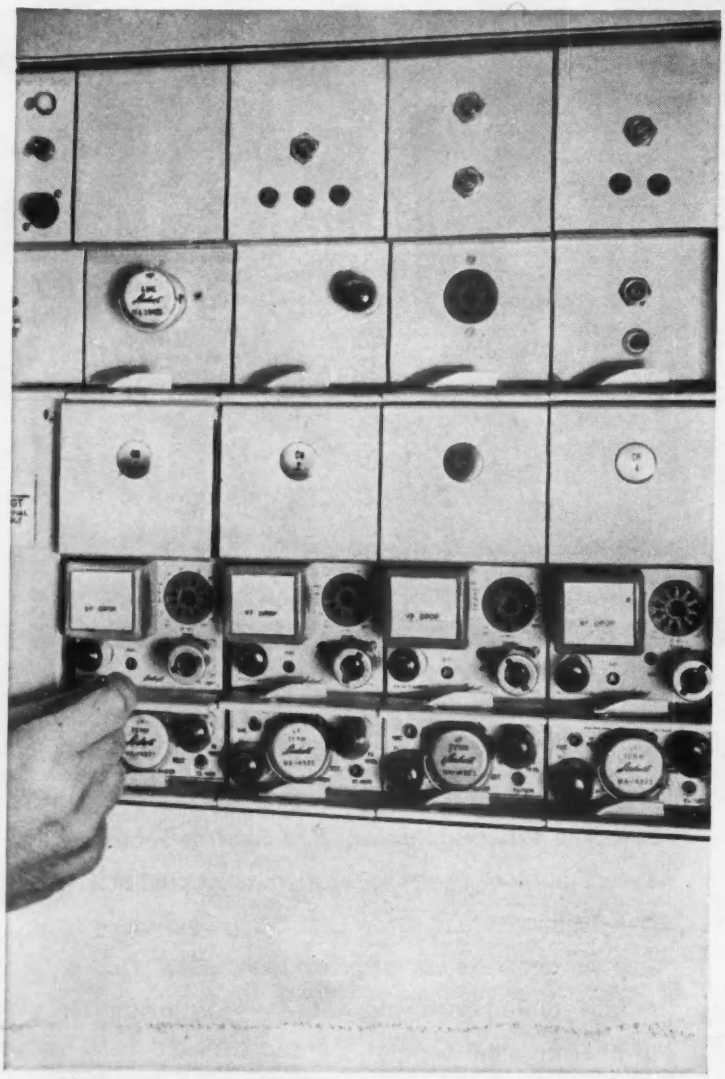
SEE OUR CATALOG IN SWEET'S — INDEPENDENT — Sherron ACOUSTIC V SEE-THRU STEEL—STAINLESS STEEL OUTDOOR AND INDOOR TELEPHONE BOOTHS

SHERRON METALLIC CORP., 1201 FLUSHING AVE., BROOKLYN 37, N.Y.

IN CANADA: W. S. GERRIE & ASSOCIATES, LTD., 66 RACINE ROAD, REXDALE (TORONTO)

Get your share of

Standardized LENKURT "plug-in" units simplify installation, maintenance and expansion in both microwave and carrier equipment



Complete 4-channel terminal assembly of Lenkurt Type 45C Carrier occupies only 15¾" of vertical rack space. Many of the "plug-in" subassemblies are common to all 45-class systems. Using different subassemblies, each channel unit can be adapted for different frequency levels, signaling options and voice-frequency terminations. Plug-in compandor on each channel permits use of many lines otherwise unsuited for high-frequency carrier transmission.

TOLL REVENUES of independent telephone companies have jumped almost 300% over the past ten years—and are expected to continue their fast climb as nationwide direct distance dialing progresses.

If you want your share of these growing toll dollars—*on the most profitable basis*—better call in the team of Automatic Electric and Lenkurt engineers.

No axe to grind

THESE MEN have firsthand knowledge of toll plant requirements, and, because they have available a *complete* line of systems, they're able to recommend the system which *best* meets *your* needs—whether it's carrier for open wire, cable or radio—microwave facilities—extension of physical circuits—or any combination of these.

For multichannel communications, you can count on Lenkurt equipment for highest reliability *at lowest cost over the years!* Lenkurt's famous 45-class Carrier — applicable to open-wire, cable or microwave—provides such exclusive engineering advantages as these:

- **direct interconnection at carrier frequencies** — reduces need for channelizing elements—cuts system costs as much as 50%.
- **unique "building-block" concept with interchangeable "plug-in" components** — simplifies installation and maintenance—permits quick, easy expansion.
- **miniaturization through extensive use of transistors** — greater reliability — fewer tubes — less power drain—saves costly floor space.

ftoll growth!

Lenkurt Type 45A Carrier, a 12-channel system for open-wire application, economically provides many short-haul and exchange circuits; can also be used for long-haul toll circuits. Type 45C is stackable in 4-channel groups. Either of these systems can be used on the same open-wire pair with a 3-channel Lenkurt 33A system or other low-frequency carrier. Type 45BN is a 24-channel system for cable; and Type 45BX provides up to 240 channels for microwave transmission. *All 45-class systems are interconnectable at carrier frequencies!*

Engineer, Furnish and Install

Automatic Electric's one-order "Package Plan" makes it easy for you to add carrier equipment or microwave without overloading your engineering and installation staff. Lenkurt's "E F & I" service provides a complete "turn-key" job if you wish, ready for "cut over" on the date promised. And Automatic's "Follow-Thru" engineering service—including ready availability of repairs and replacements — is yours *for the life of the equipment!*

Want more facts? *Send the coupon today—or call for an Automatic Electric engineer!*

Automatic Electric Sales Corporation
Northlake, Illinois ***(Attention: T. B. Collins)***

☐ *Please send literature on Lenkurt equipment.*
☐ *Have your representative contact us.*

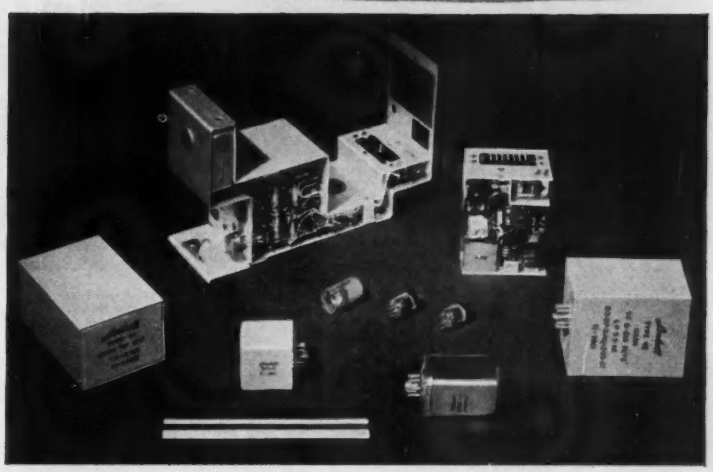
Name ..... Title .....

Company .....

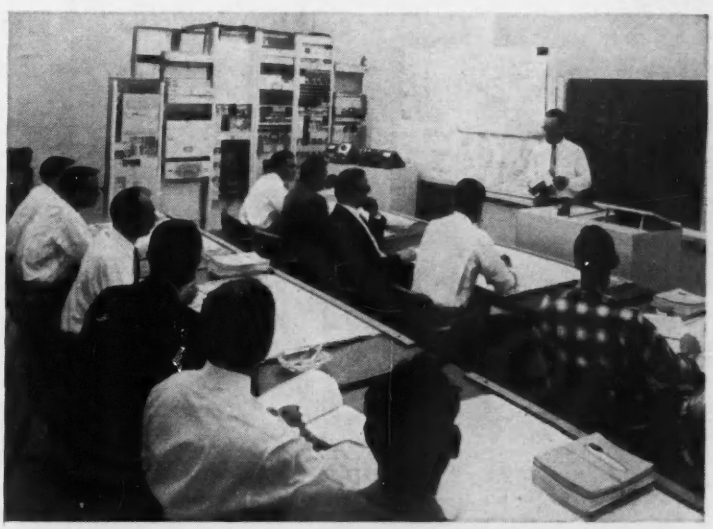
Address .....

City ..... Zone ..... State .....

In Canada: Automatic Electric Sales (Canada) Ltd., 185 Bartley Drive, Toronto 16, Ontario



Lenkurt 45-class Carrier channel unit with "plug-in" subassemblies shown removed. Standardized "plug-in" components simplify installation and trouble-shooting. An inoperative circuit can be restored to service in minutes by substituting a good spare unit for one suspected of being faulty. Factory maintains complete unit repair and replacement service.



Technical Training School with full-time instructors is operated for training in installation and maintenance of carrier and microwave equipment. Classes are offered at field locations as well as at plants in San Carlos, Vancouver and Mexico City. Complete publications service "in telephone language" includes training aids to help customers organize their own programs.

AUTOMATIC ELECTRIC

Northlake, Illinois • Subsidiary of **GENERAL TELEPHONE**

NEW, SHORT *Koiled Kords**

CUT HANDSET LOSSES . . . on Coin Collector Telephones

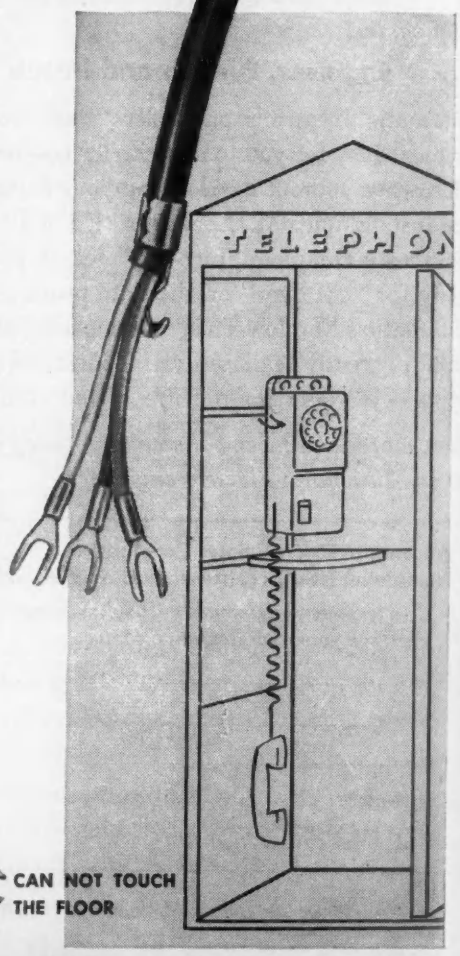
KOILED KORD ILLUSTRATED IS ACTUAL SIZE

These new short KOILED KORDS retractile cords allow sufficient length for use in telephone booths but are short enough to prevent the handset from hitting the floor if dropped.

Figure your past losses from broken handsets and you'll see how much these new short KOILED KORDS can save you.

These new short KOILED KORDS are available for Automatic Electric, Kellogg, Stromberg-Carlson and Western Electric handsets.

KOILED KORDS, the original retractile cords, are the result of 17 years of research, development and use.



CAN NOT TOUCH THE FLOOR

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Koiled Kords INCORPORATED, BOX K, NEW HAVEN 14, CONN.

PROVED BEST for restaurants

the **BN** **Booth**

attracts the eye day or night,
promotes more revenue. Colorful, clean, sturdy –
the BN Booth is best for you, too!

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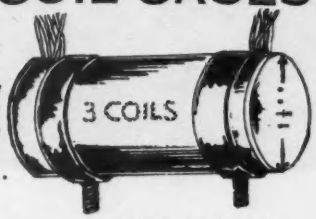
a B-N booth is a busy booth!

CEECO

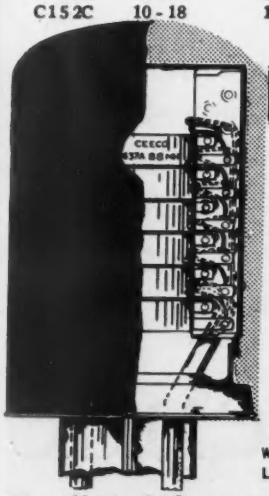
C152 TYPE LOAD COIL CASES

with types C651 (44MH) or C652 (88MH) coils encapsulated in plastic. A new smaller size for mounting directly in plastic cable splice-terminal cases.



TYPE	NO. COILS	MAX. LGTH.
C152A	1-3	3''
C152B	4-9	6¼''
C152C	10-18	13''

WRITE TODAY FOR BUTELCO CIRCULARS 158-A AND 258-C



CEECO

PARKWAY PEDESTAL TERMINAL

For loading plastic direct burial cables. Uses types C637A (88MH) or C637B (44MH) coils. 6 to 26 pair blocks loaded only as needed. All steel construction provides an easy access for testing, splicing, connecting or for buried drop distribution.

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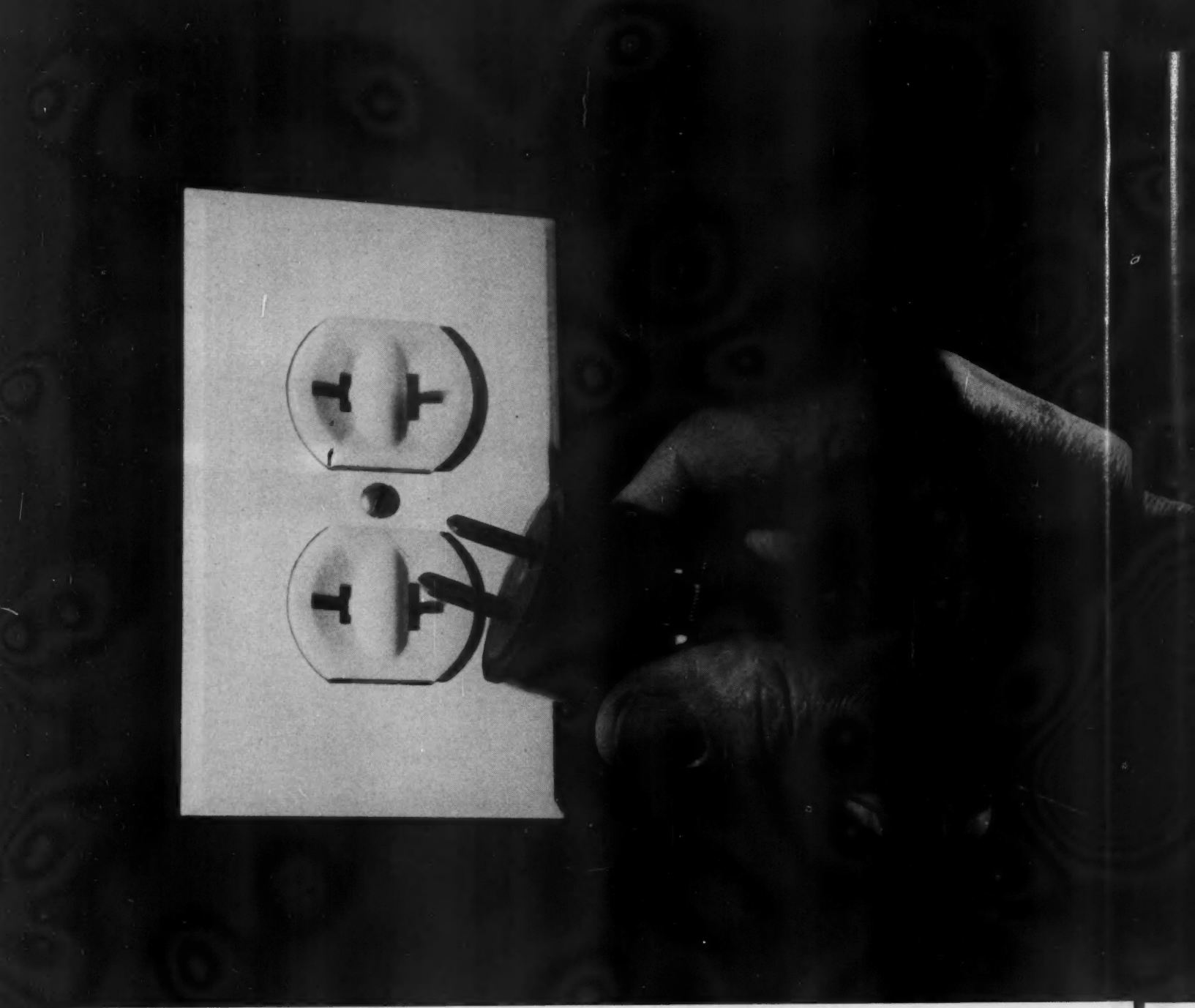
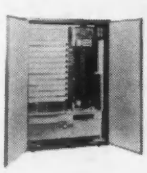
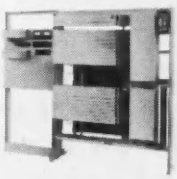


Plug in for extra revenue

Here are two XY® PBX's that are complete, factory-wired—ready to plug in and start producing extra commercial revenue for you right away:



1. *The Stromberg-Carlson F-40*: a compact, mobile "package" with capacity of up to 40 lines and 10 trunks (8 central office, 2 information). The handsome cabinet, finished in office gray, can be placed anywhere in your subscribers' offices. It takes only 8 square feet of space. Thick insulation inside doors and sides makes the unit virtually noise-free. Also furnished without cabinet where soundproofing is not needed.



2. *The Stromberg-Carlson F-80*: rack-mounted without cabinet, like the F-40 in principle and operation, offering the same subscriber benefits—but with twice the capacity.

Your Stromberg-Carlson representative will gladly supply full details, features and specifications. Your telephone call, wire or letter will receive prompt attention.

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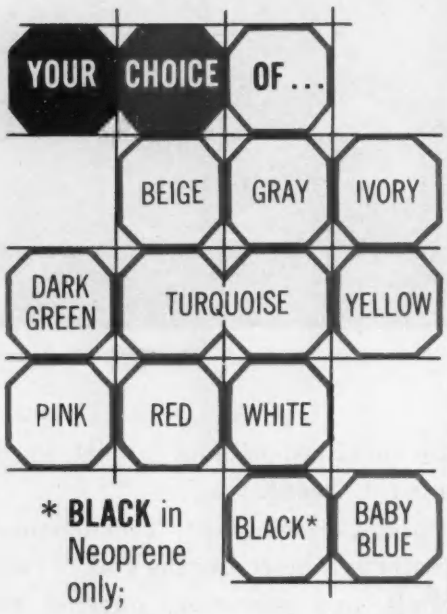

* **BLACK** in Neoprene only;
all others in Plastic

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QUALITY CORDS FOR ALL MAKES AND TYPES OF TELEPHONE INSTRUMENTS

WASHINGTON OBSERVATIONS

by ROLAND DAVIES and FRED HENCK

BDSA'S Communications Division sets 1959 telephone station gain at 3,191,282. Report estimates construction expenditures at $2.825 billion and forecasts communications equipment manufacturers will produce 7,750,000 telephone sets and 3,250,000 lines of dial C. O. equipment.

BDSA Forecasts Busy Year For Telephone Industry

OUTLOOK and review studies issued Dec. 26, 1958 by the Communications Industries Division of the Business & Defense Services Administration predict a busy year for U. S. telephone companies and the U. S. communications equipment industry.

"Station gain and the number of telephones installed should increase in 1959 despite the fact that station gain, percentagewise, for 1958 was slightly lower," the BDSA report stated.

During 1958, the estimated total telephone gain numbered about 2,862,965 or 4.5% gain over 1957. Indications and trends, because of increasing confidence in the economy, place the telephone station gain for 1959 at 3,191,232, or 4.8%, both an increase over 1958 and "a good omen for the future," the report said.

"Operating revenues, the backbone on which a business survives or fails," BDSA reported, "are increasing annually for the telephone industry. It is estimated that the operating revenue for 1958 will be $7.75 billions, a gain of $650 million over 1957. Salaries, taxes, inflation, and other factors have increased the amount of expenditures. Yet, earnings per share of stock in the telephone companies clearly indicate the economic health of the industry. From the information and facts available, the low ebb of the recession for this industry was passed in the third quarter 1958. . . ."

According to the BDSA report plant investment, including equipment for the operating telephone companies in the United States was $10.51 billions on Dec. 31, 1949.

"The operating companies have poured billions of dollars annually into construction work to keep up with the demand for service," the report stated. "Construction includes buildings, equipment within buildings, and the outside plant (including cable, poles, and other such equipment). Capital investment has steadily increased at an auspicious rate. At the end of 1958 it should total about $23.5 billions.

"Likewise, the increased investment provided a means for larger and larger revenues. The revenues over the same period have increased from $3.26 billions to almost $8 billions per year. The operating expenses and taxes increased proportionately so that the ultimate profit for the owners and stockholders were in accord with the formulae handed down by the state and Federal regulatory bodies. At the end of 1957, the taxes paid, including excise taxes, per month per telephone averaged $2.92.

"The construction program of the operating companies have been on the increase, partially because of general telephone expansion and mobilization planning requirements."

Construction figures set by BDSA are as follows:

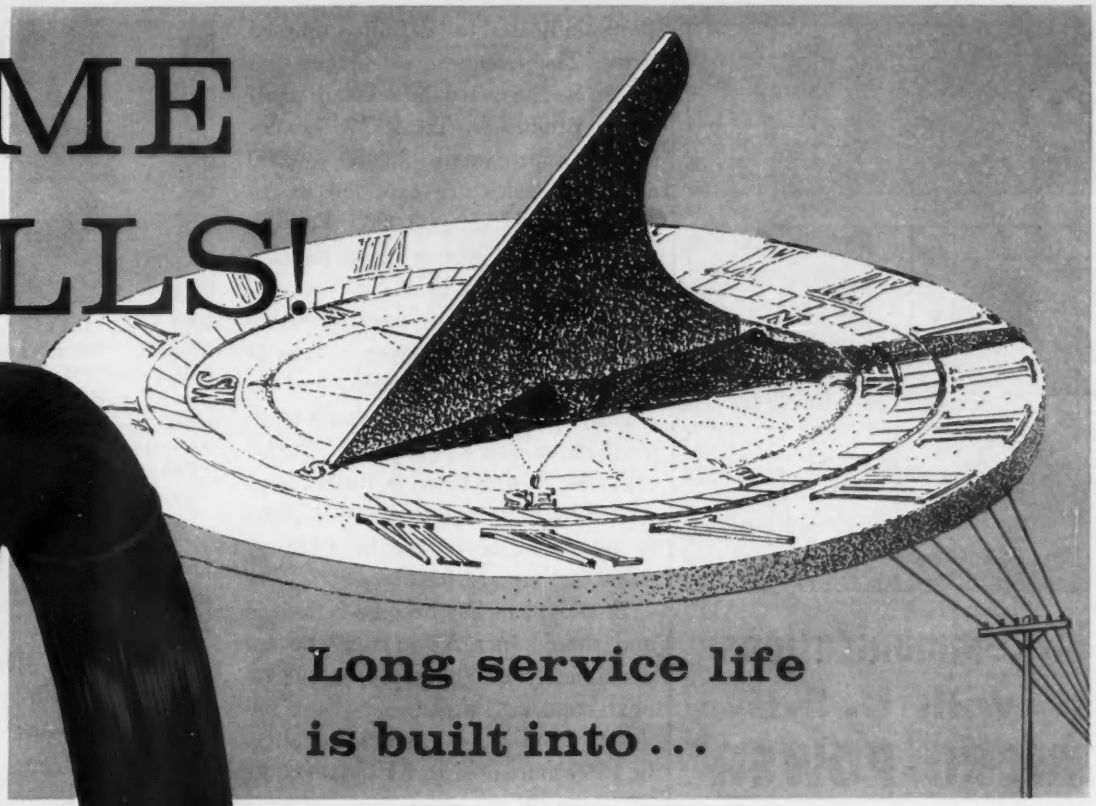
Construction Expenditures

Year	Billions of Dollars
1956	2.6
1957	2.9
1958 *	2.5
1959 **	2.825

*Estimated
** Forecast

Referring to the communications equipment manufacturing industry, the BSDA report stated, "The outlook for the Communications Equipment manufacturing industry for the year

TIME TELLS!



Long service life is built into . . .

Copperweld Line Wire

T.M.

Through the years, copper has been known for its permanence and conductance . . . steel for its strength. Each of these metals, alone, provides only a part of the qualities necessary for good line wire. All the qualities are brought together when these two time-tested metals are inseparably molten-welded to form Copperweld* Line Wire.

The thick copper covering provides high, lasting conductivity and protection against corrosion. With its protected steel core, Copperweld withstands heavy ice and wind loads, assuring safe and economical long-span construction. Records of companies everywhere show that Copperweld Line Wire gives long service life at lowest annual cost.

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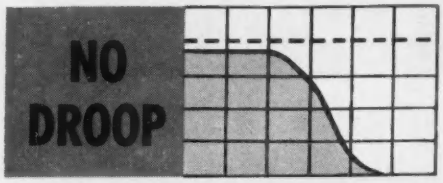
COPPERWELD STEEL COMPANY

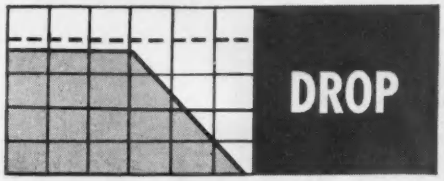
WIRE AND CABLE DIVISION *Glassport, Pa.*

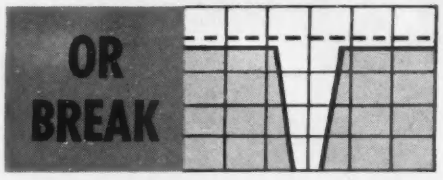
For Export: COPPERWELD STEEL INTERNATIONAL COMPANY, New York

CONDUCTIVITY STRENGTH PERMANENCE

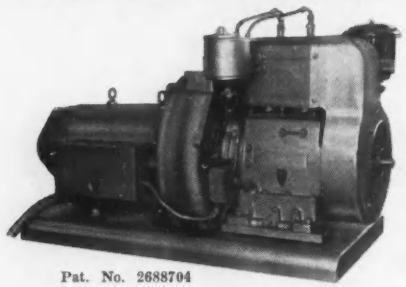
PROVED IN SERVICE FOR OVER 40 YEARS







in Communications with U. S. MICRO-POWER®



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Micro-Power operates *with* the main source of power. No time consuming "load transfers." No "power outages" *even for precious seconds!*

Micro-Power Units are available in 1500, 3000, 5000 and 10000 watt capacities. For complete information, specifications, and demonstration, write . . .

UNITED STATES MOTORS CORPORATION
LIGHT US POWER
OSHKOSH · WISCONSIN

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1959 indicates a definite upward trend. The Domestic sales represent an across-the-board increase in most items produced. Total 1958 sales should approximate $2,480,000,000 and 1959 sales are expected to increase to $2,550,000,000. Foreign sales also indicate a proportionate gain of 10% over 1958."

Commenting that the industry's confidence in the long-range view is reflected in its manufacturing and expansion plans to avoid imbalance in production and employment, BDSA reported, "Confidence is further supported by building construction plans to increase floor space in 1959 by 4,000,000 equare feet."

Employment has become stabilized and should increase in 1959 by approximately 10,000 employes, the report stated. "Purchases by the industry from 32,000 outside suppliers in 1958 amounted to $1,150,000,000, of which 29,000 were small business concerns. The trend of these purchases in 1959 will be slightly higher. . . ."

Reporting that the manufacturing of telephone instruments and dial central office equipment was off about 10% during the first two quarters of 1958, due mainly to the heavy inventory carry-over from 1957 and reduction in demand, the BSDA study presented the following tabulation which shows statistically the output of the principal equipments and components from 1956 through 1959:

ROLAND DAVIES, left, editor of TE&M's "Washington Observations" is editor of "Telecommunications Reports," and FRED HENCK, right, co-editor of TE&M's "Washington Observations," is executive editor of "Telecommunications Reports," Washington, D. C.

employ less than 500 people. These purchases amount to $1,150,000,000 each year. Consequently, many small businesses are dependent upon the economic health of the communications industry. . . ."

"It manufactures the amazingly complex electronic control equipment for the Nike guided missile systems," the report said. "It also constructed the DEW Line (Distant Early Warning radar line), located in the Artic

EDITOR'S NOTE

TE&M is happy to present "Washington Observations" as a regular "every-issue" feature. If you need more information on Washington developments, send your request to "Washington Observations," care of TE&M.

Principal Products
Communications Equipment and Component Production
Years 1956 — 1959
Quantity of Production in Units

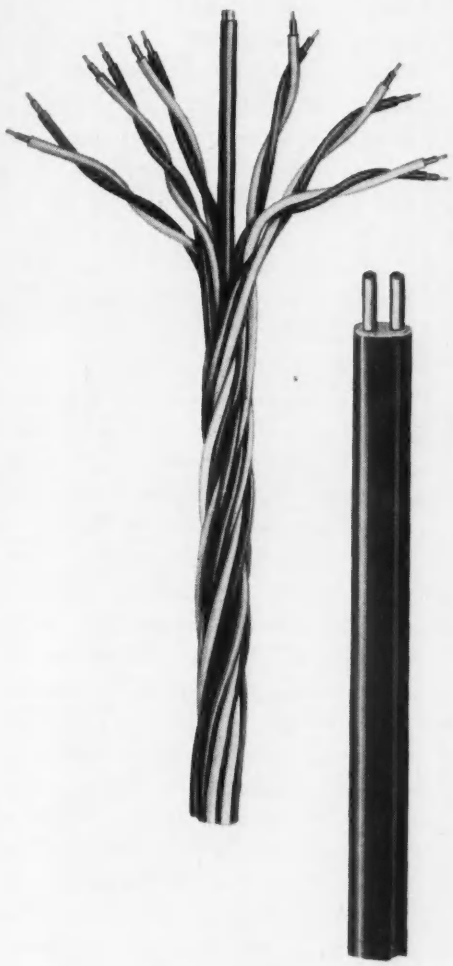
Product	Unit of Measure	1956	1957	1958*	1959*
Tel. sets	sets	8,018,656	7,958,992	7,300,000	7,750,000
Dial C. O. Equip.	lines	4,121,362	4,691,601	3,188,864	3,250,000
Dial PABX Equip.	lines	386,015	537,543	419,475	475,000
Manual C. O. Equip.	positions	6,667	6,722	4,774	5,200
Manual PBX Equip.	positions	20,863	16,382	9,169	11,150
Ringing machines	units	21,139	20,112	18,250	20,500
Repeater Equip. (voice & telegraph)	repeaters	199,931	361,813	349,400	325,000
Intercommunication Equip.	stations	12,259	16,292	14,000	15,200
Telegraph office equip.	instruments	47,317	45,023	43,500	44,000
Protectors, communications	units	4,160,130	3,342,007	3,015,000	3,425,000
Cable terminals	units	733,415	612,950	592,000	650,000
Telephone booths, metal	booths	21,959	29,302	22,400	26,000

* Estimated

"The communications industry," BDSA stated, "relies upon small business to a great extent, as evidenced by their purchases in 1958 from some 32,000 manufacturers of which 90% along the northern edge of the continent. The nation's defenses against invading aircraft are further integrated by the SAGE system, in which this

Continued on page 20

In Times of Change... depend on ANSONIA® Ankoseal® RURAL CABLES



to meet every changing requirement

Ansonia's leadership in quality and service meets the challenge of America's progressive telephone industry.

Ankoseal Rural Cables now being shipped have been modified as follows:

RURAL DISTRIBUTION WIRE

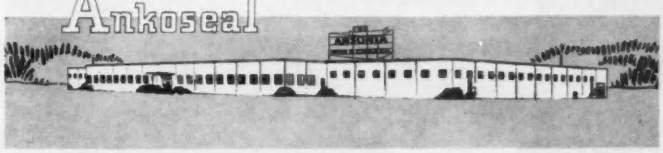
All Ankoseal Rural Distribution Wire, including the popular 3-6-11 and 16 pair sizes, conform with new REA color coding.

PARALLEL LINE WIRE

Ankoseal Parallel Line Wire is manufactured as specified by the REA.

For complete information on the finest rural cables made, contact your authorized Telephone Supply Distributor or write direct to Ashton 1, R. I.

THE ANSONIA WIRE & CABLE COMPANY



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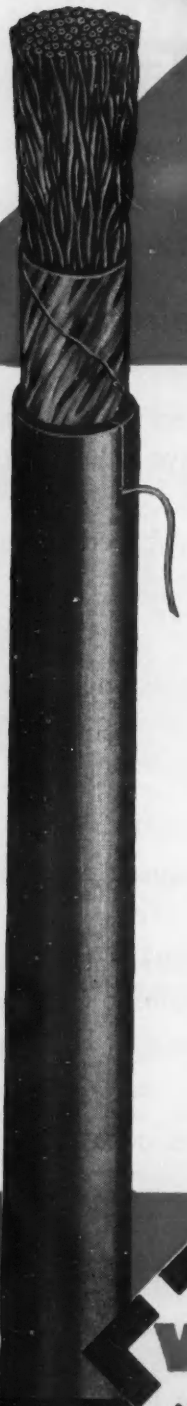
"Leadership in Plastic Cables Through Quality and Service"

600-8

WHITNEY BLAKE

Telecable

INSIDE WIRING CABLE



Available in Brown or Ivory Jacket in 22 and 24 A.W.G. from 6 to 76 pairs. WB Inside Wiring TELECABLE offers many advantages including:

- Light weight for easy installation
- Moisture resistance for damp ducts
- Plastite insulation resists crushing
- Easily pulled when installing in ducts
- Unaffected by humidity
- Easy to terminate
- Full color-coded insulation assures lasting polarity identification
- Jacket is tough, flame and abrasion resistant
- Steel rip wire makes stripping easy
- Permanently marked with gage and number of pairs

INDEPENDENT

WB

5-8

WELL BUILT WIRES SINCE 1899

WHITNEY BLAKE COMPANY

NEW HAVEN 14, CONNECTICUT

industry is playing an important part."

Noting that United States export and import trade in communications equipment is relatively small compared with domestic consumption, the BDSA report stated, "Exports of telecommunications equipment have increased more than 50% in the past few years and have raised the export sales to over $46,000,000 in 1957 and approximately $50,000,000 in 1958."

Nevada Phone Executives Form State Association

THE NEVADA Telephone Association has been formed by telephone company executives from 10 of the operating companies in the state. Meeting at the Hotel Tropicana, Las Vegas, last month, the association was formed to provide mutual assistance and benefits and exchange of ideas and information pertinent to the industry.

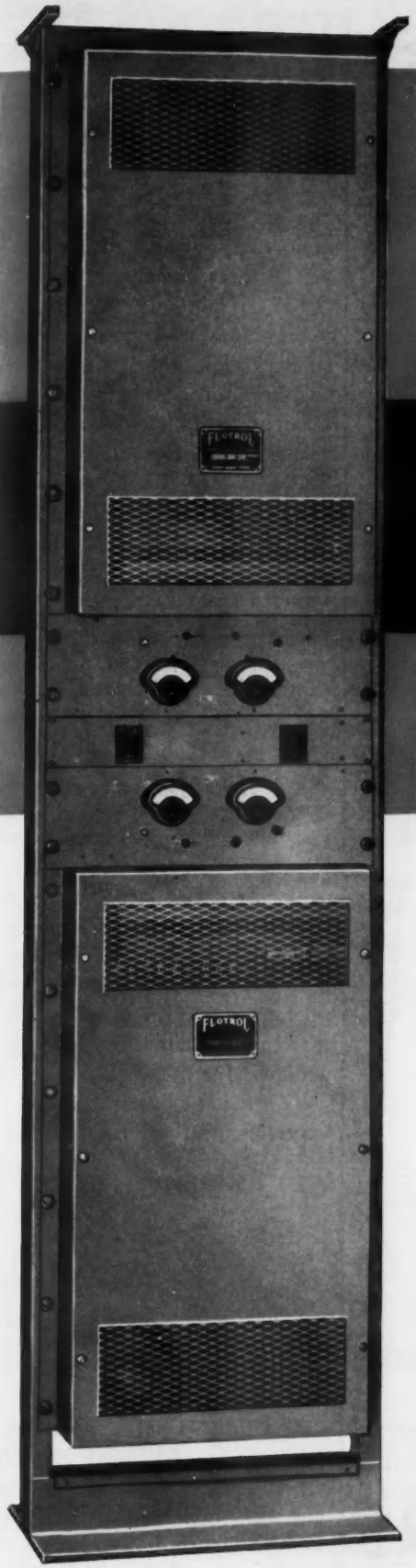
Officers include President Mike Burns, Rio Virgin Telephone Co., Mesquite; Vice President John Christian, Jr., Lincoln County Telephone System, Pioche; Secretary-Treasurer, Mrs. Evelyn Gerow, Yerington Electric Co.; and directors Allye Lawson, Southern Nevada Telephone Co. and Paul Bond, Bell of Nevada, Reno.

Committee appointments were given to the following: Herschel Trumbo and Helen Chauncey of the Henderson Telephone Co., convention and program; Gilbert O. Thamos and Walter Geary, Southern Nevada Telephone Co., and James Pulsipher, Rio Virgin Telephone Co., finance; Art Force, Southern Nevada Telephone Co., legislative and publicity; Mack Lyon, Moapa Valley Telephone Co., and William Urga, Henderson Telephone Co., settlements and acquisitions.

United of Ind. Announces Organizational Changes

R. F. LUCIER, head of the United telephone properties in Indiana and Ohio with headquarters in Warsaw, Ind., has announced the following major organizational changes became effective January 1:

(1) G. A. Steele, current vice-president, secretary and treasurer,



2 in the space of 1

LORAIN DUAL FLOTROL CHARGERS

TWO STANDARD FLOTROL CHARGERS TEAMED TOGETHER FOR THE UTMOST IN FLEXIBILITY, SAFETY, COMPACTNESS

You get standby peak capacity or additional operating capacity — without using additional costly floor space!

The Lorain Dual Flotrol Battery Charger Assembly consists of two complete Flotrols mounted one above the other in a standard 23″ relay rack. The upper unit is inverted to bring all meters and controls to eye level, along with easy-access input and output leads. Total floor space: 24-3/8″ x 15″.

The two chargers can be used either individually, or continuously in parallel. In addition, an automatic control panel (optional) allows either Flotrol to be selected as the primary charger with the second unit automatically operated in response to load demands exceeding the capacity of the primary charger.

Maintenance work or replacement of either unit leaves the other in service.

Automatic proportional sharing of the load when operating in parallel is available on most of the 14 models.

Single-phase Duals offer a range of outputs from 24 to 48 amps. (input 230 or 115 volts, 60 cycles). Three-phase Duals cover 50 to 100 amps. Capacity of a Dual unit of less than maximum rating can be increased at any future time by substituting a larger Flotrol for either unit.

Lorain Dual Flotrols are offered in many combinations of chargers, controls and accessories. You can buy complete assemblies or any part you require. Get the full story.

Write for Bulletin 174A

THE ONLY COMPLETE LINE OF POWER EQUIPMENT FOR COMMUNICATIONS

our equipment is sold through leading telephone distributors

FLOTROL SUB-CYCLE

LORAIN *Products Corporation*

1122 F Street Lorain, Ohio Phone: ATlantic 8-9191

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ROBERT T. PAYNE
Assistant Manager
MONROE TELEPHONE COMPANY
Monroe, North Carolina

IRWIN BELK, President — SAM PHIPPS, Sec.-Treas.

MONROE TELEPHONE COMPANY
INCORPORATED
Box 617
MONROE, NORTH CAROLINA

September 10, 1958

Mr. K. C. Gillett
Sales Manager
Communication Equipment & Engineering Company
5646 Race Avenue
Chicago 44, Illinois

Dear Mr. Gillett:

I should like to take this opportunity to express our sincere appreciation for your efforts in getting the loading coils to us such that we could proceed with the conversion of our new dial office as scheduled. We placed this office in service on September 7, as planned and we can assure you that this would not have been possible, had you not been so cooperative.

You can rest assured that when we need equipment such as you manfacture at any future time, we will certainly do business with your firm.

Yours very truly,

Robert T. Payne
Assistant Manager

RTP:bs

SEP 13 1958

SERVICE TO CUSTOMERS
is our reason for being in business!

COMMUNICATION EQUIPMENT & ENGINEERING COMPANY
5646 West Race Avenue • Chicago 44, Illinois
Phone EStebrook 8-3109

assumed the position of vice-president and general manager and will continue as a director of United Telephone Co. of Indiana, Inc.; Ohio Telephone Service Co.; and Jasper Telephone Corp.

(2) Lucier continues in the capacity of president and chief executive officer as well as a director of each of the three companies.

(3) T. A. Danielson, former auditor, became a vice-president and assumed the positions of secretary and treasurer, previously held by Steele. Danielson continues as a director in of the three companies.

(4) H. D. Clingenpeel became a vice-president of each of the three operating companies and continues as a director of each. He continues to serve as general commercial superintendent.

(5) Assistant Auditor, Glenn Carpenter, succeeded Danielson as auditor, and Marvin Becker, purchasing agent, became chief accountant. Becker's purchasing agent position has been filled by L. R. Stoops, former assistant secretary and assistant treasurer.

(6) Jack C. Cluen, general traffic superintendent, has assumed the added duties of assistant secretary and assistant treasurer of each of the operating companies and became a director of United Telephone Co., of Indiana, Inc.

(7) C. H. Burris, general plant superintendent for the three companies and director of United Telephone Co., of Indiana, Inc., became a director also of Ohio Telephone Service Co.

(8) H. F. Clapper, Greenville, Ohio, district manager, assumed the added duties of division commercial manager for Ohio Telephone Service Co.

The three companies employ over 1,100 workers and serve 103,000 subscribers in 96 exchanges throughout northern and central Indiana and western Ohio.

USITA Announces New Committee Chairmen

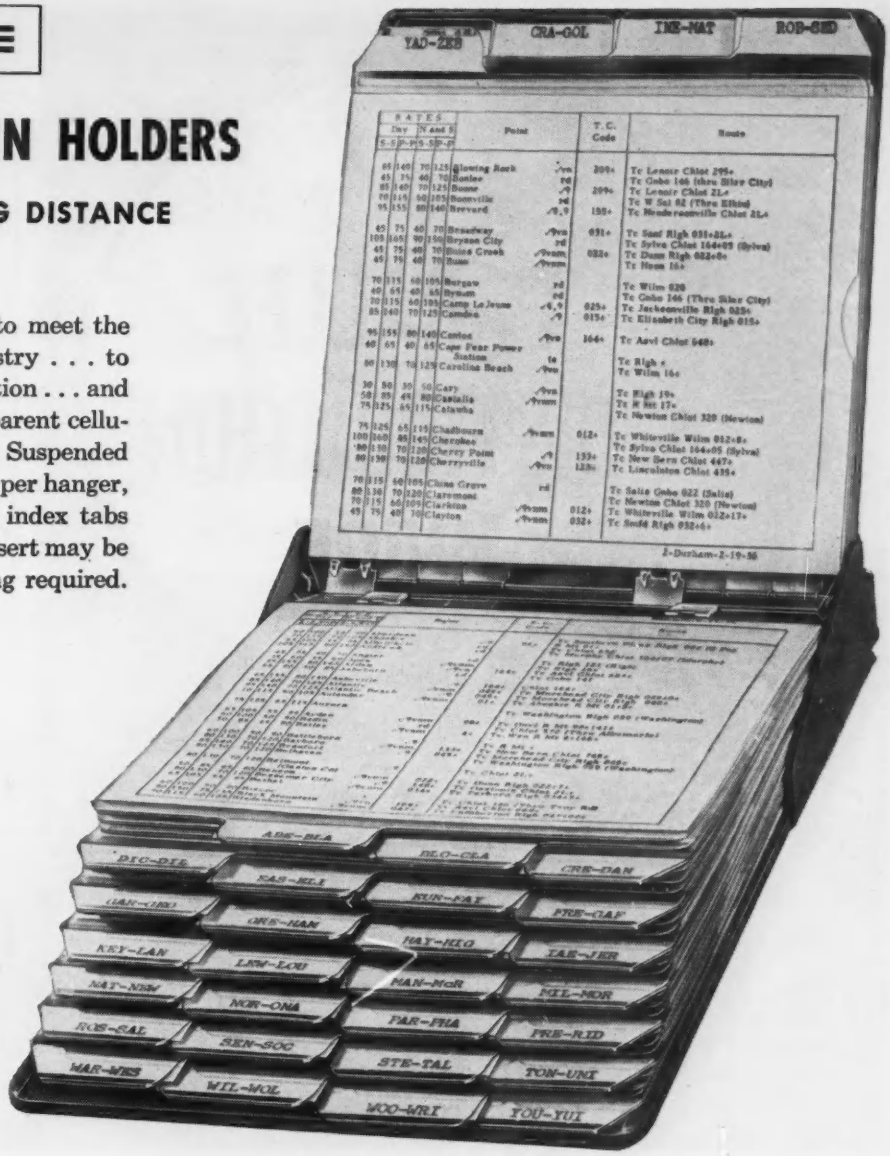
APPOINTMENT of a number of new committee chairmen for 1959, and creation of a new Military Liai-

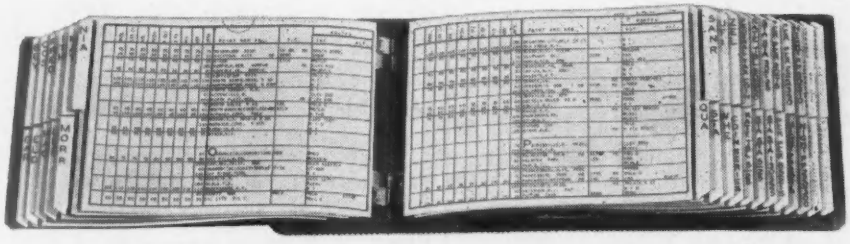
ACME VISIBLE

MULTI-CARD BULLETIN HOLDERS

FOR RATE AND ROUTE LONG DISTANCE INTER-TOLL DIALING

Developed with telephone engineers, to meet the exacting needs of the telephone industry . . . to conserve time . . . reduce cost of operation . . . and improve customer service. Clear transparent cellulose acetate pockets hold card inserts. Suspended on steel hangers with 2, 3, or 4 pockets per hanger, both sides are visible. Large durable index tabs protect the printed inserts. Any card insert may be used . . . no special punching or printing required.





VERTICAL UNITS are carried in stock in three sizes with 10, 15 or 20 hangers . . . each with 2, 3 or 4 pockets per hanger, capacities up to 3,840 listings. Made on order to fill any capacity requirements.

HORIZONTAL UNITS, recommended where space from front to back of key shelf is limited. Made in various sizes, to provide required capacities, utilizing the width space.

UNITED STATES INDEPENDENT TELEPHONE ASSOCIATION

Acme Visible Equipment is designed for telephone use by Systems Engineers in close cooperation with practical, experienced telephone experts. Tell us your requirements and receive our suggestions and quotations.

ACME VISIBLE RECORDS, INC., Telephone System Division, Crozet, Virginia

Please send us illustrated booklet of equipment specifically designed for Telephone Companies.

☐ **We are interested in Acme Visible equipment for** _____ **records.**
(kind of record)

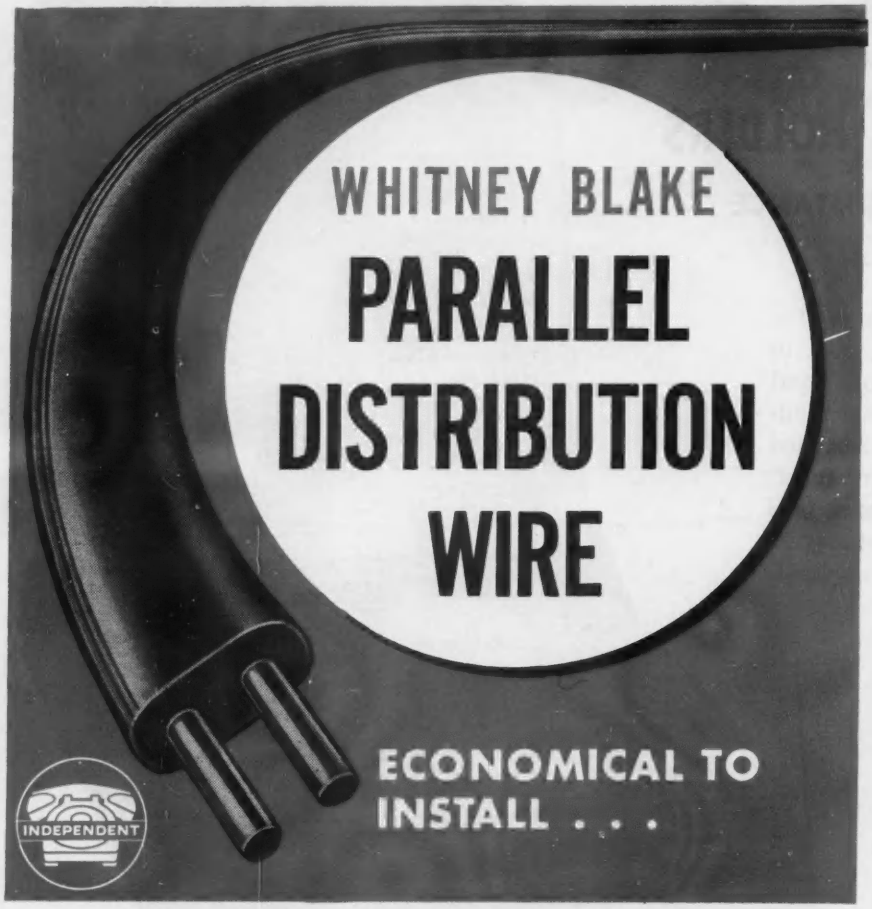
Check department: ☐ **Accounting** ☐ **Commercial** ☐ **Plant** ☐ **Traffic** **S-159**

☐ **Have representative call.** **Date** _____ **Time** _____

Company _____ **Attention** _____

Address _____

City _____ **Zone** _____ **State** _____



A minimum of labor is involved in installing WB Parallel Distribution Wire. It is ideally suited for long span construction. The high molecular weight polyethylene jacket is unaffected by adverse atmospheric conditions and also protects against transmission interference caused by tree branches, kite strings and other foreign objects falling across open wires.

WB Parallel Distribution Wire is made to the same high standards of quality that have maintained Whitney Blake leadership in the Independent Telephone Industry.

son Committee, were among recommendations which have been approved by the US Independent Telephone Association Executive Committee.

The new military liaison group is headed by William C. Henry, who heads the Northern Ohio Telephone Co., Bellevue, Ohio, and who has been a single military liaison representative for USITA. Other committee members are W. M. Driggs, Bloomington, Ill., and Paul H. Henson, Lincoln, Nebr.

A Telephone Marketing Committee has been established, and Allan R. Stacey, Sunland, Calif., has been named chairman, replacing the former Telephone Merchandising Committee.

In the Toll Compensation & Settlements Committee, still headed by W. R. Jarmon, General Telephone Corp. vice president, Lloyd W. Cleveland, Lincoln, Nebr., has been named to head the Special Service Subcommittee, succeeding Colonel Henry.

A new combined Advertising Committee was established, still headed by C. C. Pearce, Riceville, Ia. It replaces the former Advertising Committee and another group which had responsibilities for USITA's national advertising program.

Frank G. LaPrade, Martinsville, Va., became chairman of the Highway Relocation Costs Committee, succeeding President Hugh A. Barnhart. R. F. Lucier, president of the United Telephone Co.'s of Indiana and Ohio, was named chairman of the National Defense Committee, succeeding President Lewis F. Shepherd of the General Telephone Co. of Pennsylvania.

Colonel Henry has been succeeded as chairman of the committee on Problems of Small Companies by Frank S. Barnes, president of the Rock Hill (S. C.) Telephone Co. William H. Todd, of Bellevue, Ohio, was appointed chairman of the Accounting Committee and of its subcommittee on mechanized operator toll ticketing replacing I. J. Devoe, Lincoln, Nebr., in both capacities.

M. Stapleton Bodine, Jefferson City, Mo., was selected to head the Plant Committee, and L. M. Raby, Tarboro, N. C., became chairman of the Traffic Committee.

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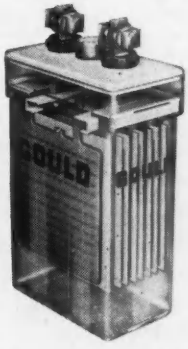

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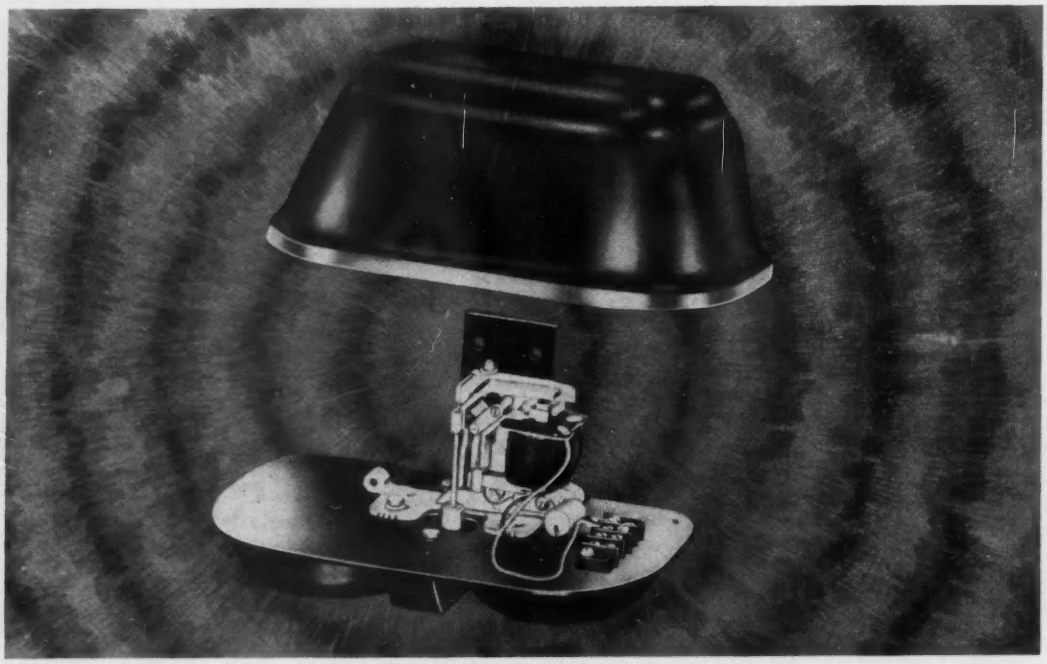

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EDITORIAL

"Government Does Start At Home"

WITH the New Year barely past its second week it is already becoming apparent that another Congressional session which will produce plenty of headlines and perhaps some sleepless nights for businessmen appears to be in the offing in Washington.

We well realize legislative forecasting is a dangerous pastime. But this year there are some basic facts, usually obscured by the headlines, which make it possible at least to decide what to look for — always assuming that world tensions won't get much worse, and being too realistic to hope they'll improve a great deal.

In our opinion there are two things to remember about the new Congress.

Heading the list is the fact that the overall complexion of Congress has clearly and obviously moved a bit to the left, with a higher proportion of "liberals."

We believe the second fact to remember about the new Congress — is that its leadership, the controlling forces in both houses of Congress, including many committee chairmen, generally consist of moderates. They have been around a long time. They know facts as well as theories. And rarely are they stampeded by a vocal minority.

It seems to us these moderates can be expected to take into account the economic facts of life of the whole country, not merely the districts or states represented by a Bill's most ardent proponents.

And right there it is well to realize what is probably the most important single fact about legislation: — *No Congressman or Senator is all-wise — he won't know what you think about something if you don't let him know.*

It has been our experience that two of the most often-heard remarks on Capitol Hill are *"My people are really up in arms about this,"* and *"I guess there isn't much interest in my district — I haven't heard from very many people."*

Since practically all legislation is a product of compromise, and there aren't very many bills which are all bad or all good, enough letters, phone calls, and visits can take some of the sting out of a piece of pretty bad legislation, or improve a fairly good one, even if it is inevitable that some bill is going to be passed.

Unfortunately, it has become fashionable in many areas to sneer at Congressmen. But the most casual reader of the *Congressional Record* should gain a new respect for his Congressman as he becomes aware of the volume and variety of matters demanding attention. The chances are that your man had a little something on the ball, or he wouldn't have been elected.

He may be forced by political realities to introduce a bill you don't like, or vote for legislation you consider pretty sad. But the difference between his going all out to put across a measure, or merely going through the motions, may *depend on how people such as you make themselves known.*

As we see it this fact is of particular importance and should be remembered by all members of the telephone industry. In fact, we believe this is a time for recognizing these important truths: (1) Businessmen do not live in a world removed from government; (2) a corporation is a legal person; (3) it is also an industrial citizen; and (4) as a legal person and an industrial citizen, a corporation should make its views known on legislation of interest to it, its employes, stockholders, and customers, and encourage such groups to present their views to the appropriate Congressional Committee or member.

The recognition of such truths plus action that will result in each industry member taking an active interest in his governments — both state and national — is a "must" for 1959. It could well be the one system that will convince Washington that government really starts at home, in the community, right in your block.

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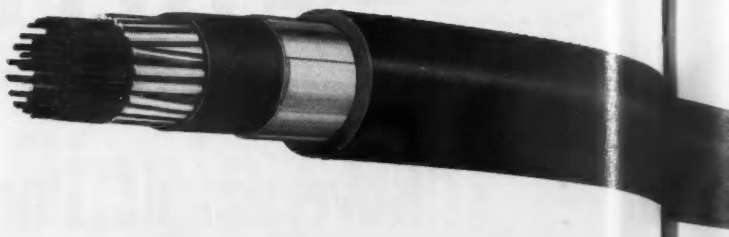
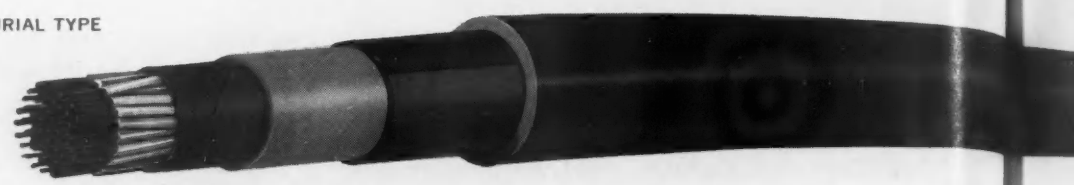
AERIAL AND DUCT TYPE



DIRECT BURIAL TYPE



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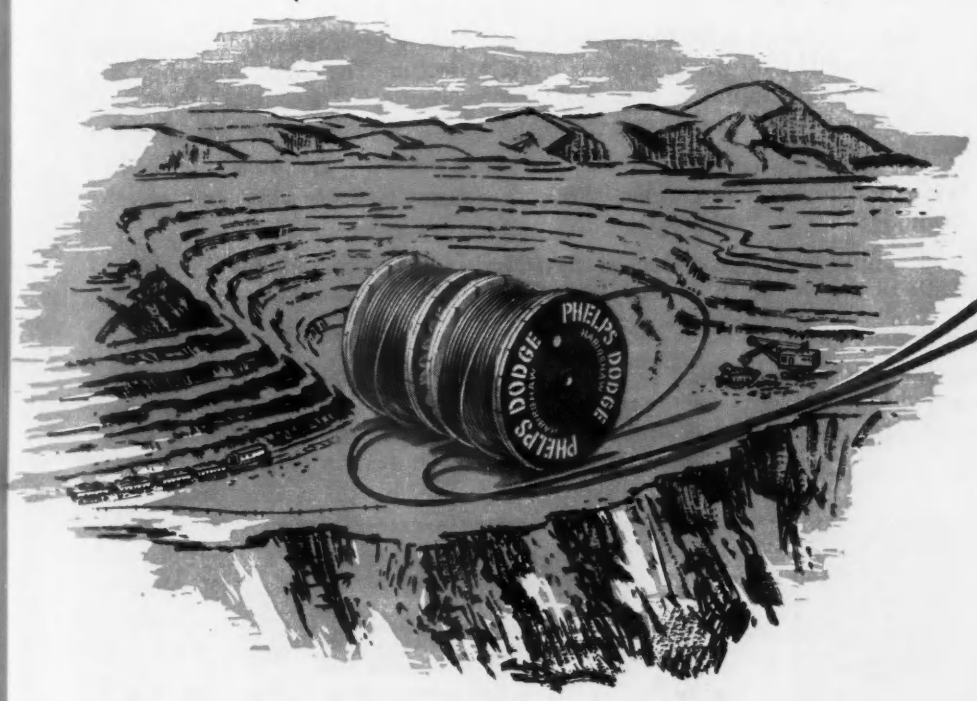

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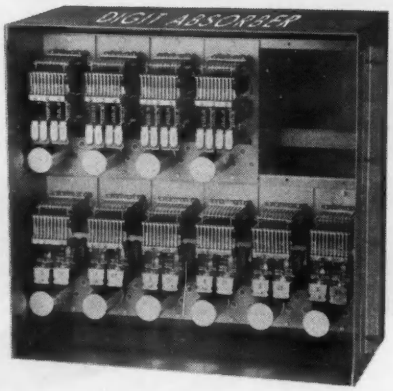
FOR CONVERTING EXISTING SWITCHBOARDS INTO FULL 2-5 NUMBERING



Digit absorber case requires 17" on a 19" relay rack. Capacity 12 units.

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The ever-increasing requirements of Extended Scope Dialing on a universal numbering arrangement are easily handled by the Universal Digit Absorber. The Digit Absorber is a factory assembled, fully-wired, applique unit that can be connected to any existing dial switchboard to pad in three digits of exchange code (ABX) or four digits in the case of a three digit dial board.

There are two types of Universal Digit Absorbers, depending on the complexity of the exchange codes assigned:

19-S unit will handle exchange codes, as illustrated by AB-X, where the "X" digit is not a duplicate of the "A" or "B" digit.

19-L unit is required where the "X" digit is a repeat of either the "A" or "B" digit.

In addition, Universal offers a Trunk Digit Register which can be applied to "Trunk on Line" dial boards where five or more digits are required to be delivered to a 3 or a 4 digit tributary exchange. This unit also affords added link hunting time and safeguards against partial digit registration.

* Pat. Pend.

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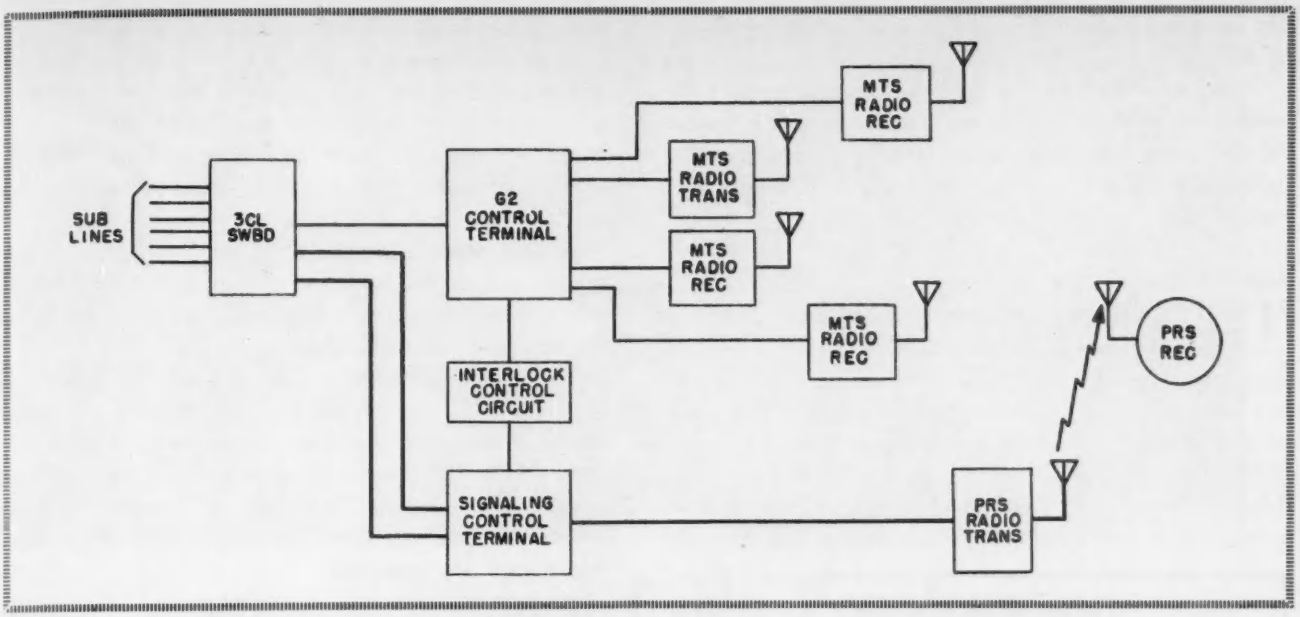


FIGURE ONE: — Block schematic, Columbus, Ohio, personal radio signaling and mobile telephone service systems.

PERSONAL SIGNALING

By NEWTON MONK and E. D. GUERNSEY*

PERSONAL signaling system operated by Ohio Bell in Columbus permits operation from a telephone switchboard in normal fashion and is arranged to operate on and share radio channel with general mobile telephone system.

Introduction

PERSONAL signaling is a new telephone service. Essentially, it is an extension of the bell on a subscriber's telephone whereby any subscriber to the service, when away from his own telephone, can be signaled selectively to indicate that he is wanted on the phone.

Assume, for example, a patient wishes to get in touch with Dr. Jones, a subscriber to this new service; he is not in his home or office. His nurse calls the signaling service operator and advises her that she wishes to signal 3749, the signaling number assigned to Dr. Jones. The operator selects an idle signaling trunk and dials this number directly into it from her switchboard position in the usual manner.

This operation causes a series of discrete signals to be broadcast from a radio transmitter. These signals are picked up by a small receiver which Dr. Jones is carrying in his pocket and cause the receiver to emit an alerting tone. This indicates to Dr. Jones that he is wanted. He then calls his office, or some prearranged telephone over the regular telephone network, and obtains the patient's message.

In 1957, an experimental personal signaling system was placed in service by the Bell Telephone Company of Pennsylvania in the Allentown-Bethlehem area. This system has provided much useful information regarding the new service. However, it requires a separate radio channel and the equipment used in the central office is not well suited to operation within the telephone plant. In particular, it is necessary for the operator to place the called number into the system by manually setting a series of four knobs. Obviously, it would be much more desirable if the operator could dial signaling calls directly from the regular switchboard.

More recently, a considerably improved personal signaling system was placed in operation by the Ohio Bell Telephone Co. in Columbus, Ohio. This system permits operation from a telephone switchboard in normal fashion. Also, as an experiment in the conservation of frequency spectrum, it is arranged to operate on and share

*Mr. Monk is with Bell Telephone Laboratories, Inc.; Mr. Guernsey is with the Ohio Bell Telephone Co. *This paper was presented at the* 1958 *IRE WESCON Convention and is reprinted from the* "1958 *IRE WESCON Convention Record.*"

the same radio channel with a general mobile telephone system.

This paper describes the new system installed in Columbus and evaluates operating experience with it. Some of the advantages and disadvantages of sharing the radio channel with mobile telephone service are discussed also.

Description of System

THE PERSONAL signaling system installed in Columbus is indicated in block schematic form in *Figure One*. Shown in this figure are both the personal signaling service system and the general mobile telephone service system with which it is integrated.

The mobile telephone system operates from the switchboard through the G2 Control Terminal, the mobile telephone service base station transmitter and the several base station receivers. The personal signaling service operates from the same switchboard through a signaling control terminal and a separate radio transmitter. An interlocking control circuit interconnects the two systems.

A GROWING SERVICE

Ohio Bell started the Columbus personal signaling service on May 1, 1958 with 40 personal signaling units and 85 mobile telephone service units sharing the channel. During the month of May the number of pocket receivers increased to 89 while mobile telephone units remained practically the same.

Both systems operate in the 30-44 mc band and the signaling system uses the same frequency as that transmitted from the mobile telephone base station transmitter. This frequency is 35.42 mc.

While it would be desirable to utilize the same transmitter for each service, this was not possible in Columbus. The reason is that the mobile telephone service utilizes frequency modulation. No suitable pocket receivers employing this type of modulation were available. Thus, it was necessary to utilize amplitude modulation and a separate radio transmitter for the signaling service.

Each signaling code is made up of four tones. These are obtained from a series of nine tones in the frequency range from about 160 to 300 cycles per second. Each of the nine tones corresponds to a digit between one and nine. To minimize the possibility of false signaling, certain combinations of digits are not employed. This restricts the maximum number of usable codes to approximately 3500.

The first tone in each code is transmitted for 0.35 second and each of the other tones for 0.25 second. The interval between tones is 0.1 second. Thus, transmission of a single code requires 1.4 seconds.

To insure receipt of the signal, each code is transmitted three times with an interval between codes of approximately 2.5 seconds. The time required to transmit a complete signal, consisting of three transmissions of the code, is, therefore, about 9 to 10 seconds.

Since it is possible to register a call while another call is being transmitted, the maximum possible number of signaling calls which can be handled by the system is about 400 calls per hour during those times that the radio channel is not required for mobile telephone service.

As indicated in *Figure One*, the personal signaling service is operated from the switchboard over either of two standard operator office trunks which terminate in the signaling Control Terminal.

The signaling codes in the form of dial pulses are stored in registers in this terminal. If the mobile telephone system is not busy, or as soon as it becomes idle, the codes are translated to signals in the form of four voice frequency tones. These are then passed sequentially over a cable circuit to the Radio Transmitter from which they are broadcast.

An Interlock Control Circuit is connected between the Signaling Control Terminal and the G2 Control Terminal associated with the mobile telephone system. Among other things, the interlocking circuit provides the following features:

1. It accepts a request for the radio channel from the Signaling Control Terminal and assigns the signaling transmitter to it if there are no mobile telephone calls in progress. If, however, the channel is busy, transmission of the signal is delayed until the end of the mobile telephone call in progress.
2. It accepts indications of incoming or outgoing mobile telephone calls and prevents the transmission of personal signals until the end of the mobile telephone call in progress.
3. It prevents initiation of a mobile telephone call, if it is originated while personal signals are being transmitted, until the signaling call in progress is completed.

The personal signals pass from the Signaling Control Terminal over a short cable circuit to the Radio Transmitter. This circuit is composited to provide two dc paths for remote control and supervision of the transmitter. One of these paths controls radiation of the transmitter's carrier and the other provides an indication that the carrier is being radiated.

The Radio Transmitter is a 250-watt amplitude modulated transmitter manufactured by the Budelman Radio Corporation and coded B-250-VA3. This transmitter is located on the forty-second floor of the Leveque-Lincoln building on which the antenna system is located.

The antenna system includes two half-wave coaxial dipole antennas. These are mounted on opposite corner beehive domes which are located on a building offset on the Leveque-Lincoln tower at a level where the tower changes in cross section.

The tips of the antennas are approximately 485 feet above the street level and about 70 feet lower than the top of the tower. The two antennas are energized simultaneously and in phase to reduce distortion in the cover-

Please turn to page 65

Plant: — Modern Cable Construction

By JOHN S. REED

CHAPTER XI-C of Mr. Reed's article discusses multiple duct clay conduit installations—the concrete base, the trench, and use of mortar bandages. Chapter XI-B appeared in the December 15 issue of TE&M.

Multiple Duct Clay Conduit Installation

CLAY conduit is manufactured from special high grade clays that are ground and molded into form and then fired at 2000 degrees. This vitrifying process changes the clay material to flint-like rock, with the surface salt glazed to produce smooth glass-like duct surfaces. The conduit is made in 24 and 36-inch lengths with standard 3¼-inch bore. Each length of conduit is combed or scarified on the outside surfaces, near the outside ends, to provide firm anchorage for joint mortar.

Dowel holes extending the entire length of the conduit enable insertion of steel pins for aligning the conduit sections.

Clay conduit is available in single and multiple duct arrangements. The multiple duct conduit can be obtained as standard 2-way, 3-way, 4-way, 6-way, and 9-way conduit. Combinations of different multiple duct conduits provide any number of ducts desired. *Figure* 303 illustrates sections of multiple duct clay conduit.

Clay conduit is also available in unglazed form with the same dimensions as the salt-glazed conduit, except that the 3¼ inch bore 4- and 6-duct full-length conduit sections are 42 inches long. The unglazed conduit also omit the scarifications at each end of the salt-glazed conduit sections. Since the mortar adheres satisfactorily to unglazed clay surfaces, there is no need for the scarifications on the unglazed conduit. The mortar bandages placed on the conduit joints adhere better to unglazed surfaces than to the glazed finish.

In laying multiple duct clay conduit, the usual practice is to provide a concrete base on which the conduit sections are laid when the soil is soft or otherwise unstable. The base consists of concrete from three to four inches in thickness. The concrete is poured into the bottom of the trench and then smoothed off to provide the proper duct drainage. Only a sufficient amount should be poured at one time to enable laying the conduit while the concrete layer is still soft enough to enable proper placing of the conduit sections. In hard, dense soils, the concrete base may be dispensed with and the conduit laid directly on the bottom of the trench.

After the trench is ready for laying the conduit, the lengths of conduit are placed in it and joined together by means of steel dowel pins, two to each joint. These dowels insure that the duct holes will be accurately aligned.

For best results, it is desirable to employ mortar bandages around the joints between conduit sections to prevent entry of silt. Each bandage is prepared by troweling the mortar onto a length of cheesecloth laid on a forming tray, and placing a water-

proof felt strip over the mortar. The cheesecloth is folded over lengthwise to form the bandage and rolled from the ends inward for taking to the trench, as shown in *Figure* 304. A bandage is unrolled around each joint and patted and tied in place.

The mortar used for the bandages is a special mix of high early strength

FIG. 304: — Steps in making mortar bandages. (1) and (2) — upper left. Spreading cheesecloth on tray and arranging tapes for bandage. (3) and (4) — lower left. Troweling mortar onto cheesecloth in tray and laying waterproof felt strip on top of mortar. (5) and (6) — top right. Folding ends of cheesecloth over felt strip and mortar layer, and dumping bandage onto tapes. (7) and (8) — bottom right. Rolling up bandage from ends while cheescloth is being laid for next bandage.

cement mixed in the proportion of one sack of cement to 147 pounds of fine aggregate and about six gallons of water. The fine aggregate is composed of sand and a small amount (about 3½%) of a pozzolanic material such as diatomaceous earth which greatly improves the workability of the mortar. The amount of water specified should be adjusted as required to obtain a good working mix that will not thin out at the corners of the conduit or slip down at the sides as the bandage is applied.

In some situations, where a mortar bandage forming tray is not available the following method may be employed to seal the joints:

A flat strip of cheesecloth six to nine inches wide is placed around the conduit and lapped about three inches on top to prevent the mortar, which is later applied, from entering the ducts.

After the joint covering is in place, the joint is plastered with a layer of mortar cement (1-3 mix) to a depth of from 1/2- to 3/4-inch. When

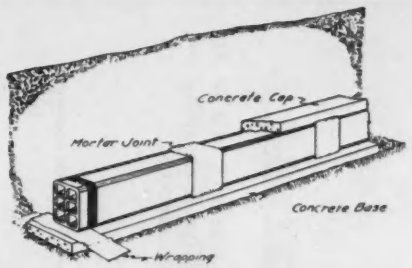


FIG. 305: — Typical method of installing multiple duct clay conduit.

no concrete base is employed, the joint should be covered to a depth of approximately one inch with cement mortar. The mortar should cover the cloth wrapping and extend over the scarified surface of the conduit (salt-glazed type).

When the duct bank consists of more than one line of conduit, the joints are staggered by the use of short lengths of conduit, starting at the manhole. A 1/2-inch bed of mortar is used to separate the conduit sections vertically while horizontal separation is regulated by the thickness of mortar joints.

After the ducts are in position, either a creosoted plank or, preferably a layer of concrete, two to three inches thick, should be placed over the conduit to protect against mechanical damage that may result from later excavations. The arrangement of concrete cap and base, and mortar joints is illustrated in *Figure* 305.

If the method used involves merely a top covering with no protection on the sides of the ducts, the earth should be filled in along the sides of the conduit and carefully tamped until level with the top of the ducts.

When mortar bandages are employed, the tamping may start as soon as the conduit is properly laid. Plastered joints require at least 24 hours setting time; otherwise tamping will displace the exposed mortar, weakening the joints.

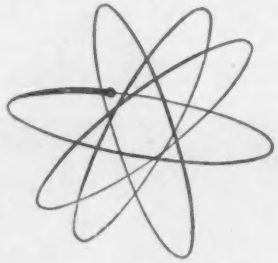
After the top protection is in place, the trench should be filled and thoroughly tamped to insure against settling of the earth.

Figure 306 illustrates the procedures involved in laying multiple duct conduit. — *To Be Continued.*

FIG. 306: — Procedures in laying multiple duct clay conduit. Top left — laying the sections of conduit. Top right — aligning conduit sections with chalk line. Bottom right — applying mortar bandage to joint and tying tapes in place. Bottom left — pouring concrete encasement.

TELEPHONE ENGINEER & MANAGEMENT'S

Electronics



NOTE BOOK

By LEO G. SANDS

Prepared For
Educational Division
TELEPHONE ENGINEER & MANAGEMENT
7720 Sheridan, Chicago 26,
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TELEPHONE ENGINEER & MANAGEMENT's
ELECTRONICS NOTEBOOK

By LEO G. SANDS

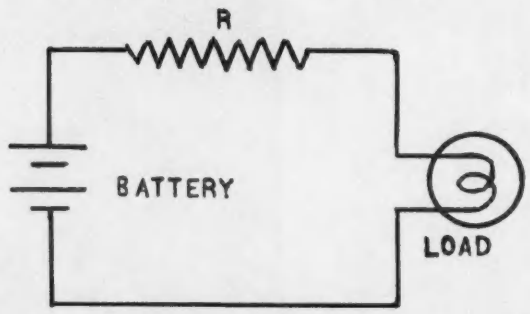
PART II
BASIC CIRCUITS

GENERAL: — Resistors are used singly or in various combinations to provide certain effects. So are capacitors, inductors and transformers. They are also used in combination with each other.

2-1-RESISTOR CIRCUITS.

Resistors are used in DC and AC circuits to perform numerous functions.

2-1.1-Current Limiting

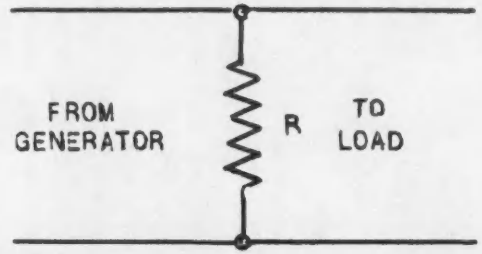


Resistor R limits current flow through the lamp. If, for example, the lamp resistance is 3 ohms, R is 3 ohms and the battery voltage is 3 volts, the lamp current will be 0.5 ampere. If R is shorted out, lamp current will increase to one ampere.

TELEPHONE ENGINEER & MANAGEMENT's
ELECTRONICS NOTEBOOK

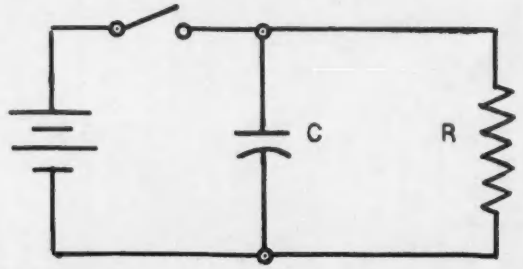
By LEO G. SANDS

2-1.2-Voltage Limiting.



A resistor may be shunted across a line as an added load to prevent the voltage from rising excessively if the main load is disconnected.

2-1.3-Bleeder.



In circuits where a capacitor is likely to remain charged after power has been turned off, a resistor across the capacitor will bleed off the charge gradually.

More Data For Your "Electronics Notebook" on Page 38.

More Data For Your "Electronics Notebook" on Page 38.

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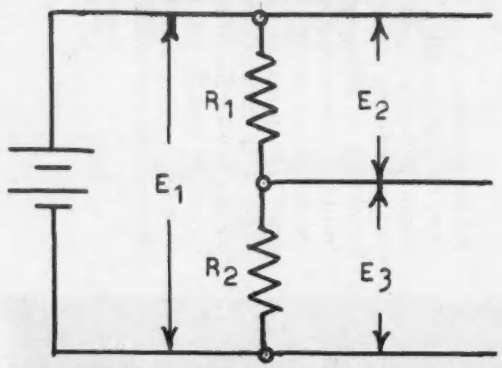
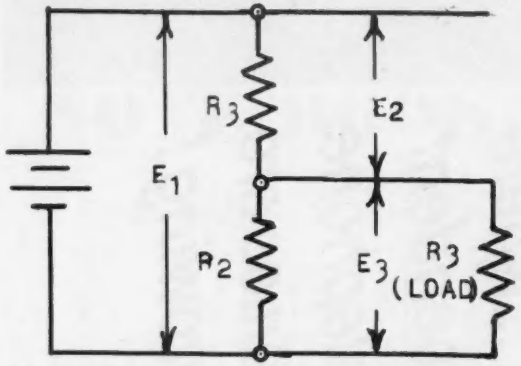
2-1.4-Voltage Divider.



If the load applied across R2 draws no current, voltages E_2 and E_3 are directly proportional to the ratio of the resistances of R_1 and R_2, since current flow through both is the same.



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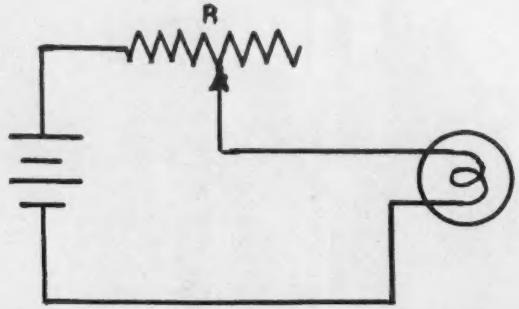
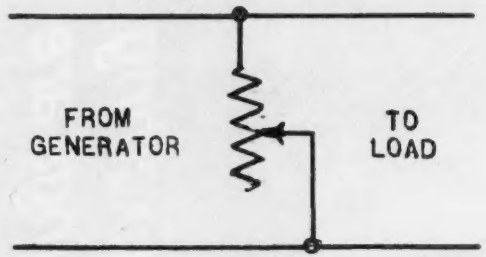
When a current-consuming load (R_3) is applied across R_2, more current flows through R_1 than R_2. Hence, voltages E_2 and E_3 are no longer proportional to resistance ratio.

2-1.5-Series Rheostat



The current flow through the load is determined by the battery voltage, load resistance and setting of rheostat R.

2-1.6-Shunt Rheostat.



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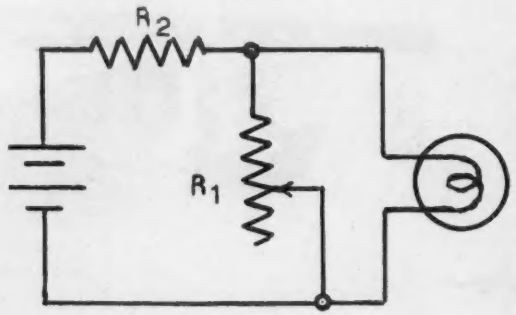
The current flow through R is determined by the voltage applied across it and the value of its resistance. Shunted across the line in this manner, a rheostat can act as an adjustable added load to prevent voltage from rising excessively in the event the main load is disconnected.

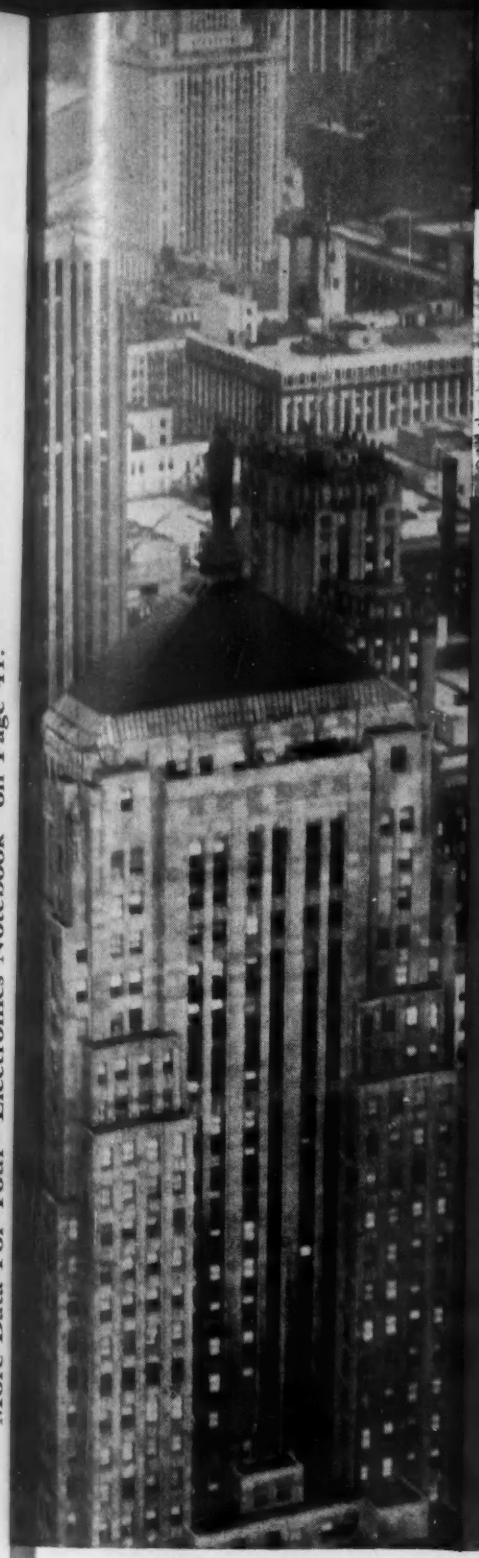
2-1.7-Shunt Rheostat



Here a shunt rheostat is employed for adjusting the voltage applied to the load. As the value of resistance applied across the load by R_1 is decreased, the voltage across the load also decreases and the voltage drop across the series resistor R_2 increases.

More Data For Your "Electronics Notebook" on Page 41.

More Data For Your "Electronics Notebook" on Page 41.



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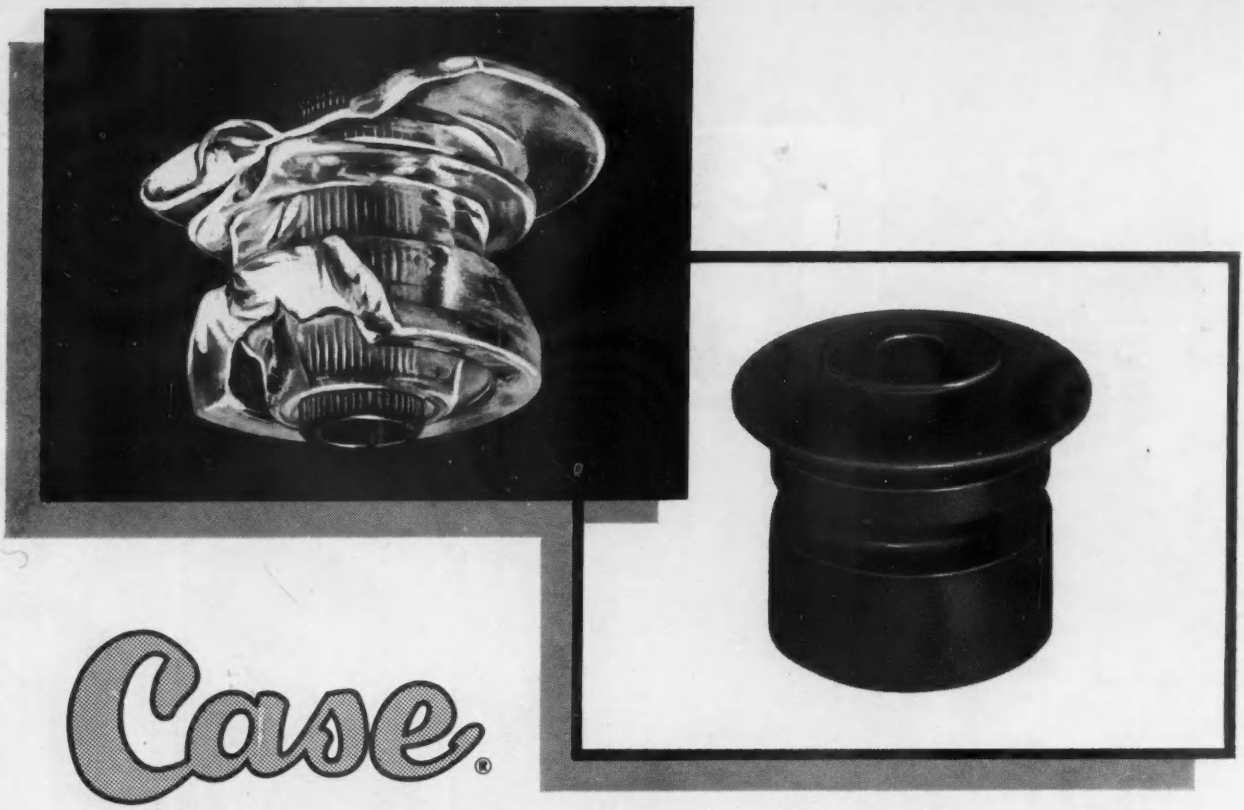

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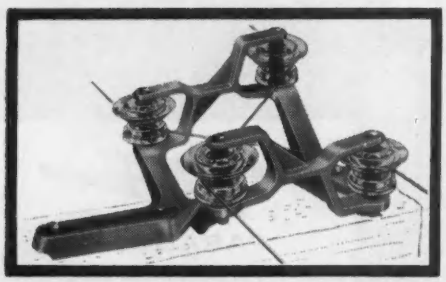
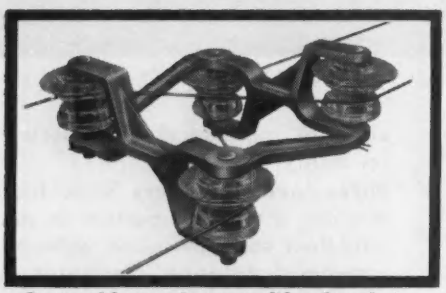


Case cross-arm transposition bracket



Case mid-span transposition bracket

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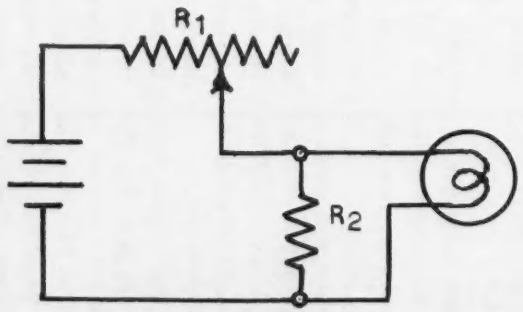
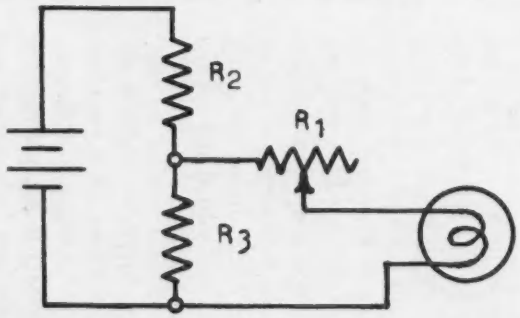
2-1.8-Series Rheostat



The circuit is similar to 2-1.5 except a fixed resistor R_2 is shunted across the load. Less resistance is required in R_1 to exercise wider control because of the increased current flow through it.

2-1.9-Rheostat and Voltage Divider



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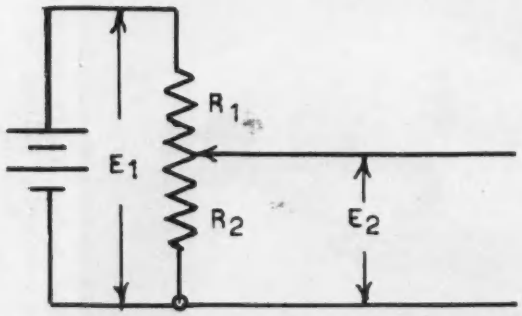
Instead of the full battery voltage, the load and rheostat R_1 are fed at lower voltage from the midpoint of a voltage divider, R_2 and R_3. The voltage at this point does not remain constant. It will drop as R_1 is adjusted for lower resistance, although the voltage applied to the load increases.

2-1.10-Potentiometer Voltage Divider



The potentiometer is generally used as a voltage divider. If the load consumes no current (as in the case of a vacuum tube grid), voltage E_2 will be proportional to the ratio of the resistance of the two sections (R_1 and R_2) of the potentiometer resistance element, which is determined by the setting of the potentiometer.

2-1.11-Loaded Potentiometer.

When the output of the potentiometer voltage divider is loaded (current flows), the voltage E_2 is no longer proportional to the ratio of the resistance of the two sections of the potentiometer as divided

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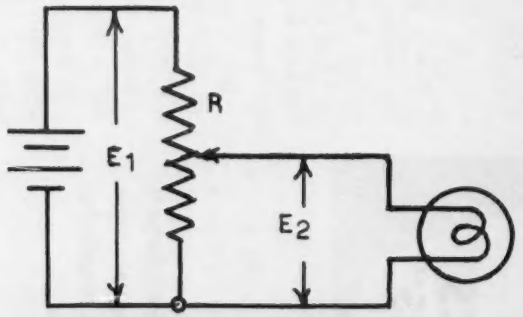
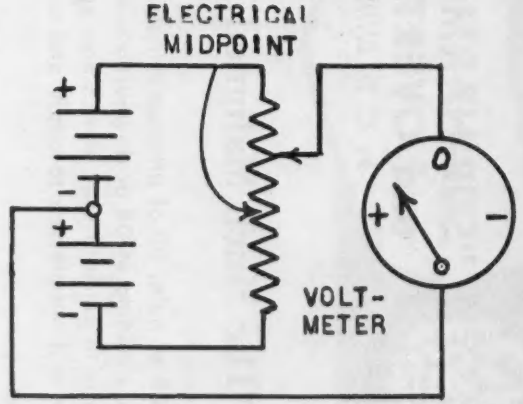


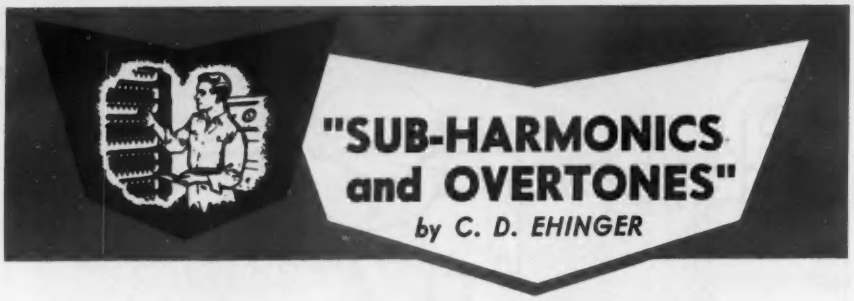
by the contact. More current flows in the series (with load) section than in the shunt section.

2-1.12-Polarity Reversing Divider.



When the potentiometer is set at the midpoint (resistance equal on both sides with respect to

More Data For Your "Electronics Notebook" on Page 44.



"The Much Maligned DB"

What about DB of gain, DB of attenuation, etc.? Have you forgotten the actual meaning of DB or do you have only a vague notion of the best way to put it to use? Here's how some simple calculations will enable you to apply and use the DB.

IN THE PAST few years I have had occasion to contact many telephone people and visit many exchanges. Of course, whenever telephone people get together the range and variety of subjects is almost endless. However, one particular subject seems to be a favorite. This item will undoubtedly amaze many who read this article, but it does seem that though we talk glibly about DB of gain and DB of attenuation, etc., too many of us have forgotten its actual meaning or have only a vague notion as to the best way to put it to use.

Also, there seems to be a great deal of confusion when shifting from one base of reference to another, to one type of terminating impedance to another, and all the other multitudes of conditions which may change or affect measurements.

It is a simple matter to be handed an instrument which has already been calibrated in decibels and to use it in making certain types of measurement of loss or gain. However, such instruments are calibrated for only *one specific condition* and unless this condition prevails, measurements can be seriously in error unless the basic principles are understood and applied in a proper manner.

I fear too many individuals shy away from anything that resembles even the most elementary arithmetic but it is necessary to apply some very simple calculations in applying and utilizing the DB to its utmost. (*However, let me urge you to read on as there will be nothing difficult about the small amount of arithmetic in this article.*)

The Author, C. D. EHINGER is president of Citizens Tel. Co., Decatur, Ind.

Before getting into the paper and pencil work, let's take a quick glance at the origin of the decibel as a unit. When the telephone industry was in its infancy, recognition was given to the fact that some means of measurement must be used to not only determine efficiency but, in some cases, acceptable standards.

It was decided this should be a function of the power sent into the line against the power received at the distant end. As an honor to the originator of the telephone, it was decided to name this unit of measurement the "Bell." It was further decided that this unit should be:

$$\text{Bell} = \log_{10} \frac{P_1}{P_2}$$

Equation One

Before proceeding, let us review the proper manner to read mathematics. *Equation* (1) should be read as "The Bell equals the logarithm, to the base 10, of Power sub-one divided by Power sub-two."

Don't worry about the arithmetic involved in the above equation as we will very shortly get into some simple examples that will refresh your memory in regard to logarithms.

It was soon discovered that a somewhat unfortunate choice had been made, since the units of power used in telephone work are quite small when compared to the units of power used in lighting our homes, as an example, or practically any other application. In fact, it was soon discovered that results, using the Bell as a measuring unit, were only about one-tenth the size necessary for ease in working and computations, etc. Therefore, it was decided to decimate the Bell and to call it the *Decibel*, leaving off the last "l" as a matter of convenience. Accordingly, the new unit is as follows

$$\text{Decibel} = 10 \log_{10} \frac{P_1}{P_2}$$

Equation Two

Equation (2) word-reads as "The Decibel equals 10 times the logarithm to the base 10, of Power sub-one divided by Power sub-two."

We will stop, at this point, long enough to examine *Equation* (2) and to apply some simple examples in order to illustrate how it can be used in discussing power levels.

Let us assume that we have a resistor of exactly one ohm pure resistance. Let us further make the assumption, for no good reason, (pure cussedness, probably) that we will use one watt as our reference level, home plate, base of operations, or whatever else you may wish to call it.

After the decision has been made to use one watt as a reference level, we then place the one ohm resistor across a source of electrical power. By means of a suitable power measur-

ing device, such as a watt meter, we discover that 10 watts of power are being dissipated in the resistor.

Let's see how we are coming along "Decibelwise" in comparison to our arbitrarily chosen "home base" of one watt. Looking back at *Equation* (2) we can substitute 10 watts for P_4 and 1 watt for P_2 and then we have:

$$\text{Decibel} = 10 \log_{10} \frac{10 \text{ watts}}{1 \text{ watt}}$$

Equation Three

A Fast Peek at Logarithms

THOSE OF you who still remember your high school logarithms have already solved this one. However, for the benefit of those who have forgotten, let's take a fast peek at this thing called logarithms.

Long ago, our mathematicians learned that 10 (or any other number for that matter) can be raised to a certain power in order to arrive at a required number. As an example, 10 can be raised to the second power (10 x 10) to arrive at 100. 10 can be raised to the third power (10 x 10 x 10) to arrive at 1,000. Similarly, 10 can be raised to a multitude of other powers. 10 raised to the first power is 10; 10 raised to the zero power is 1; 10 raised to the sixth power is 1,000,000, etc, ad infinitum. We can list these figures:

$10^0 = 1$

$10^1 = 10$

$10^2 = 100$

$10^3 = 1{,}000$

$10^4 = 10{,}000$

$10^5 = 100{,}000$

$10^6 = 1{,}000{,}000 \ldots$ etc.

Looking at the above table, it can be seen that the logarithm of 100 (to the base of 10) is 2. The logarithm of 1,000,000 (to the base of 10) is 6. In other words, the logarithm of any number (to the base of 10) is the power, or exponent, which will raise 10 to the original number. Powers, or exponents, do not necessarily need to be whole numbers. They can be fractional numbers or even negative numbers. As an example, 10 raised to the 1.699 power is 50; 10 raised to the .301 power is 2; 10 raised to the 2.8451 power is 700; etc.

Fortunately, complete tables of logarithms are widely available at a nominal cost and are easily used. It is my hope that the above "quickie" review is enough to refresh your memory of logarithms in a manner to suffice for use in calculations involving the decibel.

Turning back to *Equation three*, we can now easily see that the logarithm, to the base 10, of 10 divided by 1 is one. Therefore, *Equation* (3) becomes:

$$\text{Decibel} = 10 \text{ X } 1 = 10$$

Equation Four

Therefore, we could now say that, in the case of our 1-ohm resistor, we are operating at a power level of 10 decibels above our reference level of one watt.

Now, let us increase the amount of power input to the 1-ohm resistor. Our watt meter now indicates that 100-watts of power is being dissipated in the resistor. Incidentally, touching the resistor with the finger, at this stage, would also quickly indicate that a good deal of power is being dissipated in the resistor. (The method of measuring the height of the blister raised on the finger as a means of computing power, or heat, dissipated is not recommended.) Again substituting our measured results into *Equation* (2) we now have:

$$\text{Decibel} = 10 \log_{10} \frac{100 \text{ watts}}{1 \text{ watt}}$$

$$\text{db} = 10 \log_{10} 100$$

$$\text{db} = 10 \text{ X } 2$$

$$\text{db} = 20$$

Equation Five

We can see, from the above, that we are now operating at a decibel level 20 db above our reference level of one watt. The example could be carried forward where, if such a resistor were available and capable of such heat dissipation, a total of 1,000,000 watts could be dissipated in the resistor, and by the same type of computation which we have previously used, you would see that we would then be operating at a power level 60 db above our reference level of one watt.

The paragraphs preceding this one have illustrated two points: *The decibel is a function of relative power measurements and can be applied to any impedance as long as it is properly and intelligently used.*

Of course the example used as an illustration would not apply to the telephone industry, as the amount of power used is much higher than the power levels which we encounter, and, it is a rare occasion when we use impedances of 1-ohm of pure resistance.

In the telephone industry, practically all power levels which we encounter, whether it be the amount of power delivered to our subscriber's handset, carrier power levels, etc., are invariably in magnitudes of milliwatts, or a thousandth of a watt.

Remembering that the decibel is a function of relative power measurements, it is obvious we must have some means of measuring these small units of power. Unfortunately, watt meters capable of measuring such extremely small units of power in an accurate manner are not available at a price that does not resemble the national debt. — *To be concluded in the next issue of TE&M* (73)

EDITOR'S NOTE

In the next issue of TE&M (Feb. 1), Mr. Ehinger will conclude his discussion of "The Much Maligned DB." Other subjects scheduled for Mr. Ehinger's new TE&M department include:

(1) "The 'Kid' Learns To Use The Right Volt Meter."

(2) "Satellites and the Telephone Industry."

(3) "The 'Q' of a Coil and Figure of Merit for Condensers."

(4) "Sleet Storm Insurance For The Telephone Plant."

(5) "The 'Kid' Is Thrown By Eddy Currents."

(6) "The 'Fletcher-Munson' Effect."

Watch for Mr. Ehinger's department in each issue of TE&M.

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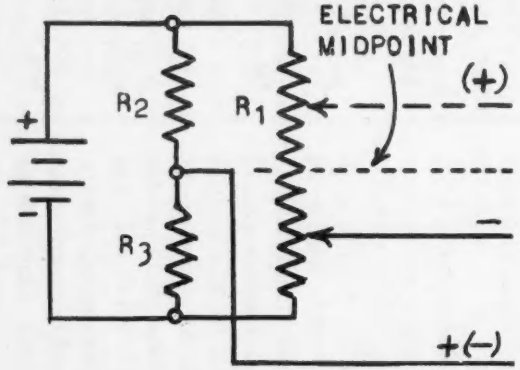
By LEO G. SANDS

contact) the output voltage will be zero. When set to favor the positive section (with respect to the electrical midpoint) the output voltage will be positive with respect to the common lead coming from the junction of the two batteries, and vice versa.

In the diagram (page 2-1-8), if a meter with zero at the center of the scale is used as the load or as an indicator, it will show a plus voltage when the pointer is in the position shown. When below the midpoint of the resistance element, the meter will show a minus voltage.

2-1.13 Polarity Reversing Bridge Divider.

Instead of obtaining a midpoint at the junction of two series-connected batteries, R_2 and R_3 in con-



nection with potentiometer R_1 form a simple bridge.

If R_2 and R_3 are equal, output voltage is zero

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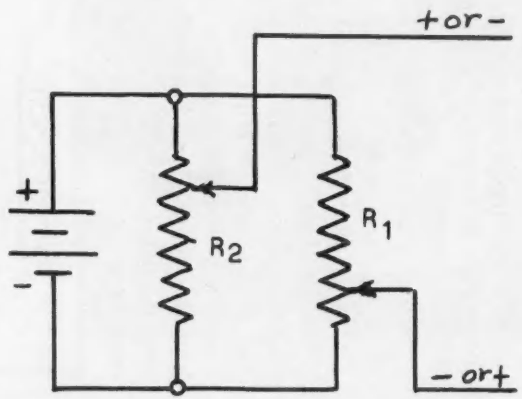
when the potentiometer is at its resistance midpoint. When above that point, output voltage will be positive with respect to the common lead and vice versa.

2-1.14 Variable Reference Voltage Divider.

Instead of two fixed resistors as in 1-2.13, a second potentiometer R_2 may be used. R_2 sets the elec-



trical reference and R_1 selects either polarity and sets the value of the output voltage whose maximum level is determined by the setting of R_2.

2-1.15 Tapped Potentiometer Voltage Divider.

Here, positive and negative voltages may be selected, and their value set, by adjustment of a potentiometer with a fixed tap which is the common output lead. If the tap is at the electrical midpoint, equal positive and negative voltages may be ob-

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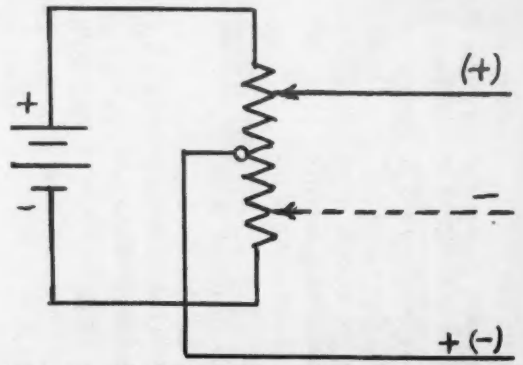
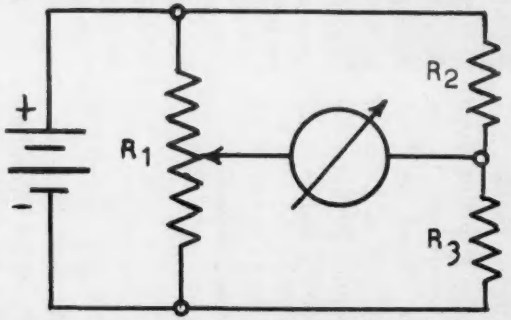


tained. It can be at other than the midpoint to establish a reference at some other voltage.

2-1.16 Resistance Bridge.

A calibrated potentiometer can be used for measuring the resistance of an unknown resistor R_3 when



the value of R_2 is known. When the ratio between R_2 and R_3 equals the ratio of the potentiometer setting, the galvanometer will read zero.

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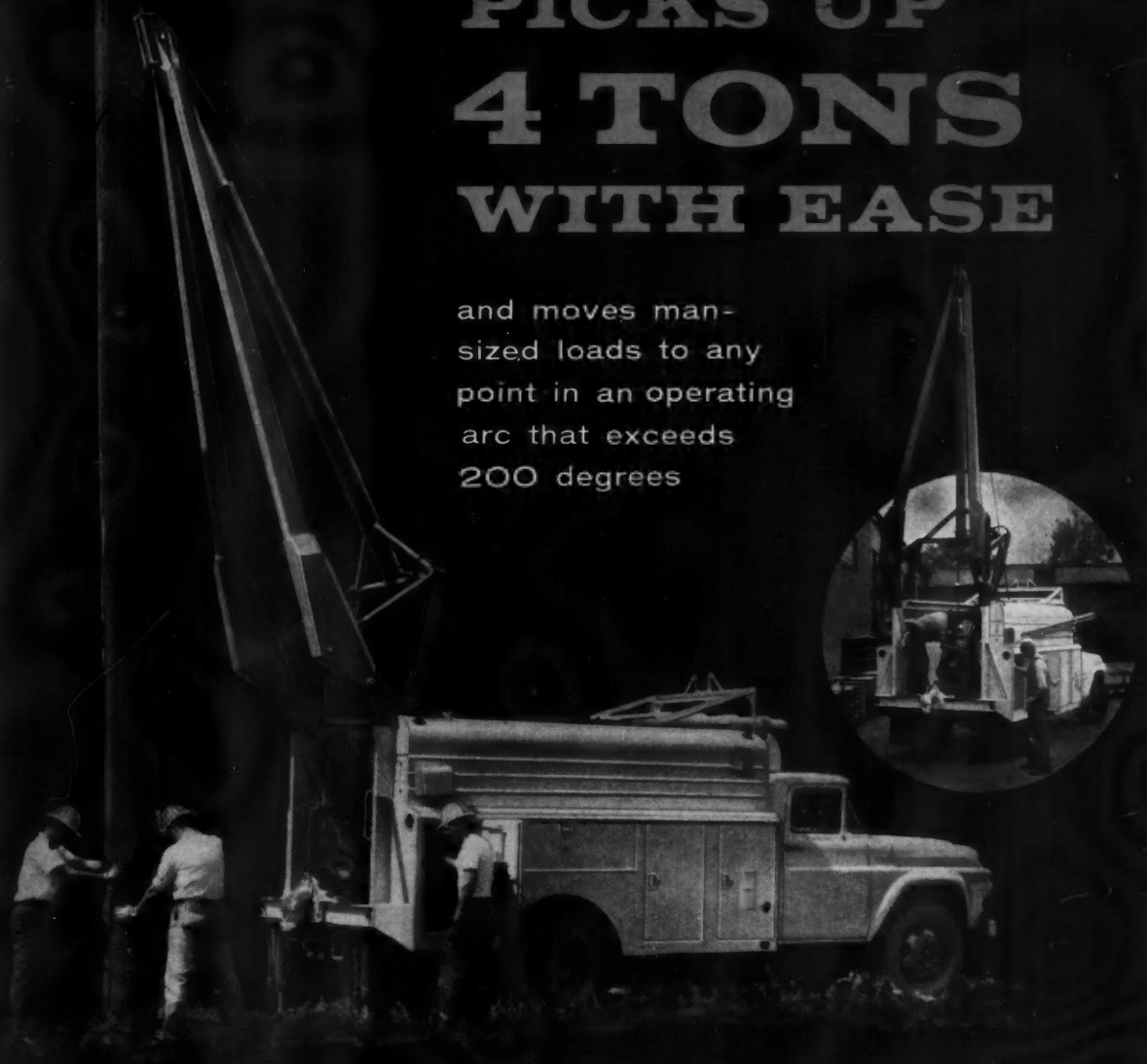

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More Data For Your "Electronics Notebook" In The Next Issue.

COMMERCIAL DEPARTMENT NOTES

by ALLAN R. STACEY

There are many ways of sampling service performance. In this article, Mr. Stacey discusses two: (1) personal visits to business subscribers, and (2) using the services of a professional organization.

WE IN THE Commercial Department are destined to receive all of the complaints about our telephone service but very few complimentary remarks regarding the good job our company and our industry are doing. This just goes to show that telephone subscribers, too, are human. It seems to be a part of human nature to take the good things for granted and to complain rather than to compliment.

If most of the comments received from the public are critical, how then do we know whether we are doing a good job or a poor service job? There are many ways of sampling service performance but two have come to my attention recently which I believe are worth further discussion. These are sending a telephone company representative to make a personal call upon the majority of your business subscribers and using the services of a professional organization to obtain subscriber reaction to each new installation of residence service.

The author, ALLAN R. STACEY, is vice-president of the Sunland-Tujunga Tel. Co., Sunland, Calif.

Personal Contacts

LET'S TALK first about a canvass of business subscribers by a telephone company representative. Some companies have never made a personal call upon their business accounts while other companies do it as a matter of routine. In fact, one company I know attempts to make personal contact with each business subscriber once in each three year span.

There are several beneficial results. First, a genuine improvement in the quality of telephone service to the subscriber can sometimes be brought about. Second, the company's public relations are immensely improved by such contacts. Third, these contacts are invaluable if the company is in the midst of a rate increase proceedings; and who isn't these days?

As the telephone company representative meets the business subscriber the first question the representative asks is, "What can I do to improve your telephone service?" (This has been called "leading with your chin.") Then the company representative sits back and listens. If the subscriber has a gripe here is an opportunity to get it off his chest. If the subscriber finds his service arrangements incomplete this is a chance to better them.

During the interview the company representative looks for ways to improve the service as it exists and also observes whether additional or different equipment would be beneficial.

With an eye to maintenance the company representative examines the equipment for worn cords and broken instrument cases. He may even dial up the testboard to make a proper test if there is any question of dial speeds or transmission.

Thinking of service expansion the company representative would study the subscriber's needs and recommend changes or additions where appropriate. For example, in a crowded insurance office situation he might recommend installation of a wall handset in order to remove the desk handset from a crowded desk top. In a butcher shop or doctor's clinical room he might recommend installations of a white or ivory telephone rather than the current black. Naturally, he would recommend additional extensions and additional trunk lines if these things would help the subscriber's telephone service.

In the event that it is not possible to contact the subscriber, the company representative leaves a personal card on the back of which is this message: — *"Sorry to have missed you. I called to see how we may improve your telephone service. Please call me at ..... if we may be helpful."* One additional attempt is made to contact the subscriber.

"What Happens?"

WELL NOW, what of the overall results from such a canvass of business subscribers? First, we have definite service improvement because we clean up some cases of required maintenance that the subscriber himself has not reported to the company. Second, the company is assured that the equipment being used by the subscriber properly fits his needs. Third, while this is not a high pressure attempt to sell additional equipment, certain items are added to the plant in service. One company in a recent campaign with total business

EDITOR'S NOTE

TE&M is happy to bring Allan Stacey's new department as a regular "every-issue" feature. If you need help on a commercial department problem write Mr. Stacey in care of TE&M.

contacts of 405 placed the following additional items into service:

Change to a colored telephone ..1
Addition of colored telephone ..1
Business extensions 3
Business main lines 5
Retractile cords 2
Secretarial lines 1
Additional key system stations ..3

You can see that the sales of additional equipment were not numerous. However, the big benefit derived from such a campaign lies in the reaction of the subscriber. He is impressed by the fact that a *personal* effort is being made to give him good service. He is relieved of any unexpressed complaints that he may have been carrying. Now he has a much more favorable impression of the telephone company and its interest in him and his service.

One additional benefit that results from such a campaign is development of a list of prospects for sale of additional service. In the 405 contacts there were seventeen subscribers who mentioned a need for additional telephone equipment in the very near future. This is a ready made prospect list.

Residential Service

RESIDENTIAL service requires a different approach to business because it is seldom possible to visit each and every residential premise. One method of obtaining subscriber reaction to the company's residential service is the employment of a professional organization which is already doing this work for other organizations in your community. One such company is the "Welcome Wagon" service. It is a nationwide organization that specializes in visiting the new people who move into your area.

This service makes a personal call upon each family that is new in the community within a week or two after that family has moved in. By the time of this call the family has probably ordered and received telephone service. During the course of the half-hour visit the Welcome Wagon representative obtains an accurate opinion as to what the reaction of the newcomer was to the telephone company business office when the service was ordered and to the telephone company installer when the service was connected at the premises. A confidential daily report is made by the Welcome Wagon upon each family visitation and this report is used by the telephone company to trace back unfavorable public reaction to either employes or procedures.

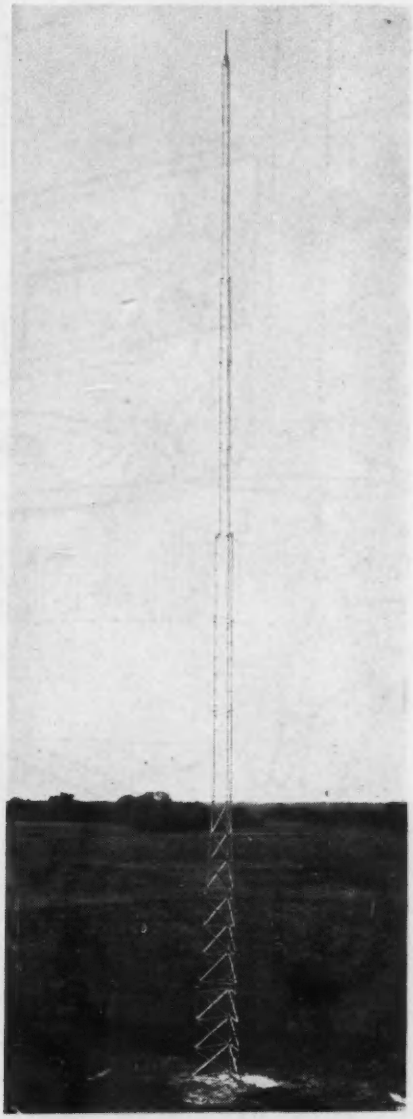
Since the Welcome Wagon representative is not publicly related to the telephone company she can do much good speaking from an apparently unprejudiced position. First off, if the company's basic exchange rates are different to those of contiguous exchanges the Welcome Wagon representative can give the reasonable explanation previously supplied by the telephone company. In the event the new subscriber does not remember the explanation given him by the business office concerning dialing instructions, billing procedure, free called points and other information the Welcome Wagon personnel can see that the newcomer completely understands the telephone system. One unusual usage made of Welcome Wagon service by one telephone company was to help select the family destined to be honored as the 10,000th telephone connected in that exchange.

I received a chuckle from one confidential daily report of contacting a new family. Maybe you will, too. It read: "*Mrs. D. mentioned how cooperative and pleasant her contacts with the office girls had been. She said she first wanted a yellow wall telephone, then she decided a beige would blend in better. She called to change it and they were very nice. Then she decided to change the color of the desk telephone. Still the girls were so pleasant, etc.*"

A final word about costs. The survey of 405 business subscriber premises cost 165 man hours. The sampling of newcomer reactions by Welcome Wagon cost less than 3¢ per subscriber.

In the next issue we shall be discussing amongst other items the practice of collecting your telephone bills by charging your subscriber's personal checking account at his local bank. — *Allan R. Stacey.*

New ROHN
SELF SUPPORTING
COMMUNICATION TOWER



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★ Rated a true HEAVY-DUTY steel tower, suitable for communication purposes, such as radio, telephone, broadcasting, etc.
★ Complete hot-dipped galvanizing after fabrication.
★ Low in cost—does your job with BIG savings—yet has excellent construction and unexcelled design! Easily shipped and quickly installed.

FREE *details gladly sent on request. Representatives coast-to-coast.*

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"Pioneer Manufacturers of Towers of All Kinds"

Now the Martins have T

TWO Telephones...

This is the Martin family. And, they're tickled pink with their new extension telephone. Of course, the Martins have always had one telephone in the front hall. But, last week Florence Martin decided to put a second phone in the family room. Here's how it happened...

On Monday, Florence stopped at the telephone company business office to pay her bill. While she was there, she noticed a display of Type 80 desk telephones. The smart, functional design of the instrument caught her eye immediately. And, she learned that the Type 80 is available in a choice of 10 beautiful colors. That night, Florence spoke to her husband about getting an extension. Sam was dubious. But, Florence convinced him. On Tuesday, she called to place her order for a Type 80 in Camellia Pink (to match her drapes). And, just look at the Martins now...

Sam thinks the extension is the best idea he ever had. He likes the lifelike transmission and clarity of the Type 80 (he's making more toll calls than before). Because the handset of the Type 80 is lighter, it's easier for little Kathy and Ricky to use. And, Florence is delighted with the beauty and convenience of her new phone. Result—the Martins are among the most satisfied customers that the telephone company has.

Your community is full of families like the Martins. Families that need extension phones. If you can sell Florence, she'll sell Sam. Use the Type 80 to earn extra revenue and increase good will in your community. To place your order, contact your A.E. salesman or write Automatic Electric Sales Corporation, Northlake, Illinois. Telephone Fillmore 5-7111. In Canada, Automatic Electric Sales (Canada) Ltd., 185 Bartley Drive, Toronto 16.

AUTOMATIC ELECTRIC

Subsidiary of **GENERAL TELEPHONE**

ACCOUNTING NOTES

by G. M. JONES

"Organization for Budgeting"

WHAT do you want to accomplish through budgeting? Here's how to define your purpose and really begin to know what questions of policy are involved in formulating procedure and in assigning responsibility for: (1) scheduling the make-up of budgets, (2) prescribing forms and rules, and (3) setting due-dates.

THE FIRST step in budgetary purcedure is to make sure what it is that you want to accomplish through budgeting. Is it improved efficiency of particular operating departments? Better cash scheduling? Ceilings on spending? Is it to provide yardsticks for managerial self-measurement? Is it to help in allocating limited financial resources? Is it to obtain a measurement of the extent to which expansion can be financed by operating revenues?

Until you can define your purposes, you cannot really begin to know what questions of policy are involved in formulating procedure and in assigning legislative responsibility.

The second step is to answer the *"Who?"* question. The necessity for specific responsibility for making the rules of budgeting is as real in a telephone company as anywhere else. Someone must have the responsibility — and the authority — for scheduling the make-up of budgets, of prescribing forms and rules, and for setting due-dates. It need not be the chief accounting officer, although usually it is.

The circumstances of the individual company may indicate that the plant engineer should have the most to say about how the budget is set up; or in some other case, the treasurer. The important thing is that the duty be definite, the extent of authority be definite, and the form and timing of the budget be definite.

The Author, G. M. JONES, is assistant professor of Accounting & Financial Administration, Michigan State University.

In most cases, the assignment rather naturally falls to an accountant, because the organization of records for budgetary purposes and for accounting purposes may be parallel, and the same information is useful for both purposes. Further, the chief accounting officer has communication with all areas of the business, without a vested interest in any one area.

On the other hand, the expenditures to be made by the plant engineer may be by far the most critical of all company expenditures, and it may be his necessary duty to determine the necessary division of available resources between operating purposes and construction purposes.

Whoever is directing the budgeting process is an adviser and coordinator and consultant. He is not to dictate to operating supervisors, nor is he a producer of the budget himself, although he can and should advise others on how to construct their particular portions of the overall budget.

Length Of The Budget Period

OPERATING budgets usually are prepared by months for one year ahead. Some companies add on a new month and drop off an old month, each month; some others add a quarter and drop a quarter; some others make no extension of the budget during the year. It is a matter of company preference, but the preference should be stated definitely so that all the people concerned will know when they will be called upon for their contributions.

Frequency Of Revision

HOW OFTEN should the budget be revised? This is a policy question that should be settled early in setting up budgetary procedure. Probably the best rule is to revise the budget during the year only if conditions change substantially enough to make the original plan completely unrealistic and invalid as a guide to operating management.

If there is a sudden drop in economic activity of any consequence, such as during the winter of 1957-58, the pattern of station installation work, for example, may change sufficiently to make the former expected manpower requirements for installation no longer valid as a yardstick against which to measure actual usage of manpower.

In the absence of any great basic change in factors affecting the business, it is best policy to prohibit tampering with the budget at short intervals; the psychological effect of

EDITOR'S NOTE

"Accounting Notes," by Dr. Gardner M. Jones, will appear in each issue of TE&M. If you have accounting questions, address them to Doctor Jones, care of TE&M.

too frequent adjustment is a feeling that it is the plan, not actual experience, that deviates. That sort of an approach to budgets will bring no improvements in operations.

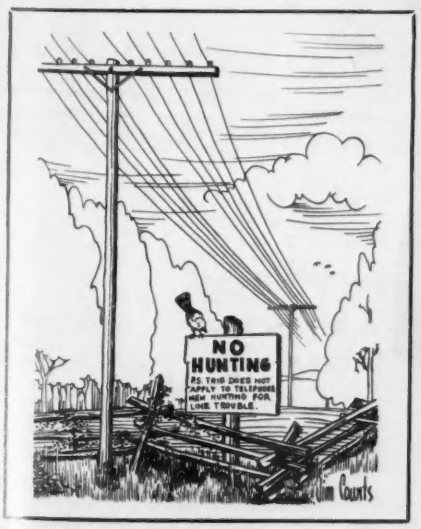
The Timing Of Budget Preparation

THE TIME required to prepare adequate plans for a period's operations is a function of the size of company, complexity of organization, extent of detail to be considered, time available for planning, and level of skill of the personnel involved.

Since replacement and expansion of plant are financed partly from operating revenue, and construction plans must of necessity be made a long time in advance, it is the practice of some companies to begin budget preparation in July or earlier, for the following year.

Estimates of operating revenues and expenses are needed in order to determine how much plant financing can be done from current revenues. For smaller companies with fewer projects underway at any one time and with fewer levels of budget review and approval, September may be early enough to begin planning operating revenues and expenses for the next year.

Whatever budget preparation period is suitable in your company, the procedure to be followed must be uniform and definite, the several steps in making up the budget must be scheduled, and each one concerned must be informed as to the due dates for work on his phase. — *To Be Continued.*



The High Tensile Wire with BUILT IN Safety Factor

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COMPARE THE PHYSICAL VALUES!	.109
Diameter (Inches)	
Breaking Strength (pounds) Rated (minimum)	1213
Breaking Strength (pounds) Average of actual tests	1350
Fatigue Endurance Strength In Pounds	466
Fatigue Endurance Strength In % of Ultimate Tensile Strength	35%
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By every rule of sound engineering practice, *Crapo* HTL-135 High Tensile Telephone Wire has proved to be the most dependable and economical conductor available for long-span rural lines.

Recommended sags and tensions for this rugged, high strength wire are based on accurately determined stress strain characteristics and on maintaining loads specified by the National Electric Safety Code. Initial unloaded tensions at the lowest temperature expected never exceed the fatigue endurance limit of the wire.

Crapo HTL-135 makes possible spans to 350 feet in Heavy Loading, 540 feet in Medium Loading and 650 feet and over in Light Loading Districts with a proven margin of safety.

Electrically, *Crapo* HTL-135 provides more than ample conductivity for typical subscriber lines in rural areas. Loops of 14 to 15 miles are practical with normal voltages and equipment. Longer loops are possible where higher voltages and more sensitive telephone sets are employed. This wire also is being used successfully with subscriber carrier current installations.

For low initial cost, low maintenance cost and all 'round reliability, insist upon the strength and high fatigue endurance characteristics provided by *Crapo* HTL-135! Write for Manual N-53 containing complete engineering data!

Crapo HTL-135
INDIANA STEEL & WIRE CO., INC. MUNCIE, INDIANA U.S.A.

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STEEL & WIRE CO., INC.
Muncie, Indiana

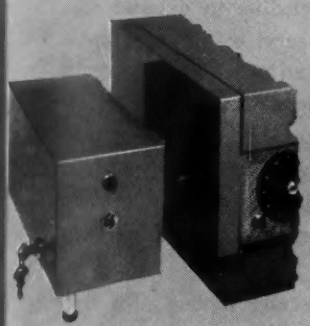
ELECTRONIC SECRETARY

MODEL
DCR-1

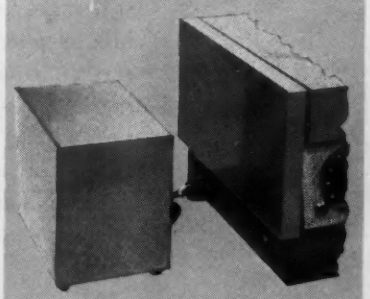
answering service

provides a complete phone answering service for your subscribers and brings you a steady flow of revenue!

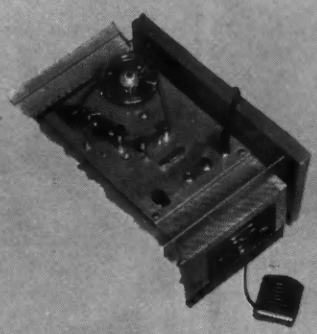
With the *Electronic Secretary* answering service, your subscriber no longer worries about missing important phone calls. It answers his phone courteously, dozens of times a day. It works around the clock, records name, number and message, or tells the caller to call another number—a complete secretarial service! A wonderful source of revenue for the telephone company! For complete information, call your distributor (listed below).



Remote Call-Back addition for Model DCR-1. Subscriber hears recorded messages by transmitting a tone signal over remote phone. The Electronic Secretary then switches to normal operation.



Voice Control Attachment for Model DCR-1. Permits caller to record message for extended period of time. Message is recorded as long as caller continues speaking. This attachment is ideal for receiving orders.



Tape Adapter modifies the DCR-1 so that user can record outgoing messages in his own voice. Includes microphone and endless tape cartridge (1½ to 3 minutes). Message can be changed as often as desired.

Model T-t Electronic Secretary. Answering unit only. User records outgoing message in his own voice. Endless tape cartridge (30 seconds to 2½ minutes). Message can be changed as often as desired.

ELECTRONIC SECRETARY INDUSTRIES, INC.

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PLANT NOTES ON NEW DEVELOPMENTS

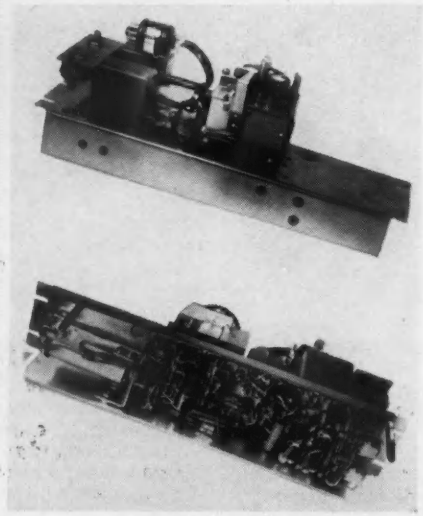
by JOHN S. REED

IN this issue TE&M's newly-enlarged "Plant Notes" department presents: (A) the latest information on a decoder for mobile telephone selective ringing; (B) six pages for your "Plant Man's 'Spec' Book"; and (C) "Questions & Answers."

Decoder for Mobile Telephone Selective Signaling

NEW, COMPACT, two-tone decoder has been developed for mobile telephone selective signaling applications. The new decoder is capable of responding to any of over 55,000 different 5-digit code combinations.

The Secode RPD-801 Decoder, which is compatible with Bell System mobile telephone operating standards,



Secode RPD-801 two-tone decoder for mobile telephone selective signaling. (Secode, Inc.)

responds to 600-cps and 1500-cps tone pulses, and is directly interchangeable, physically and electrically, with Western Electric VS-1 decoder units now in use in mobile telephone systems.

The new decoder is half the size of existing decoders and is available in two basic forms, one for inboard mounting within a mobile radio unit housing and the other, an enclosed outboard assembly, for installation alongside the associated radio equipment or other convenient location.

By using the new Secode decoder, mobile telephone system capacity is increased from 4000 possible 5-digit code combinations to over 55,000.

It is stated that the development of the new compatible Secode decoder will make it feasible to expand mobile telephone service into a national system. Duplication of numbers will not be necessary and a vehicle, equipped with a mobile telephone going from one service area to another, can be signaled from any mobile telephone central office within radio range.

The new Secode device also features a greatly improved signal-to-noise ratio which extends the operating radius of the base stations. Field tests indicated that signaling was reliable in fringe areas where speech transmission was unintelligible.

The heart of the new compatible decoder is the Secode type 49HS selector, an electro-mechanical pulse counter of extremely rugged and simple design, which was developed specifically for mobile applications. The code to which an individual decoder will respond can be changed in less than one minute without using tools.

In laboratory tests the Secode 49HS

selector functioned properly even when subjected to severe vibration and shock, in excess of that anticipated in vehicular service.

Another Way to Use Wheatstone Bridge for Locating Opens

THE TRITE saying, "There's more than one way to skin a cat," would apply to locating an open in a cable circuit. An open conductor in a telephone cable is not easy to find and cable men have their own pet method of searching for this fault. One successful technique that requires making no more than three cable sleeve or sheath openings was recently described to us by an old time splicer. A wheatstone bridge and a cable tone set are employed in this method.

The first step is to make exploring coil tests to isolate the section in which the open conductor is located. The section may be between two cable terminals, or it may be a branch cable, underground cable, or a buried cable.

The second step involves opening a splice sleeve or a place in the cable sheath as close as possible to the supposed location of the open. This opening should be on the side of the fault that would produce the greater distance than the other side. Locate the pair containing the open conductor and select a good pair, which must be of the same length and conductor gauge as the bad pair. Both pairs must appear in all terminals and branch cables, if any. These pairs must also be free from shorts, crosses, or grounds.

The new "Plant Man's 'Spec' Book" will appear in each issue of "Telephone Engineer & Management." We urge all readers to read and file these informative 'Spec' book sheets for future reference.

If the length of the cable from the sheath opening to the terminal end is 500 feet or less, *accurately* measure the length of the cable between the conductors in the sheath opening and the posts in the cable terminal. Then set up the wheatstone bridge and tone test set and make

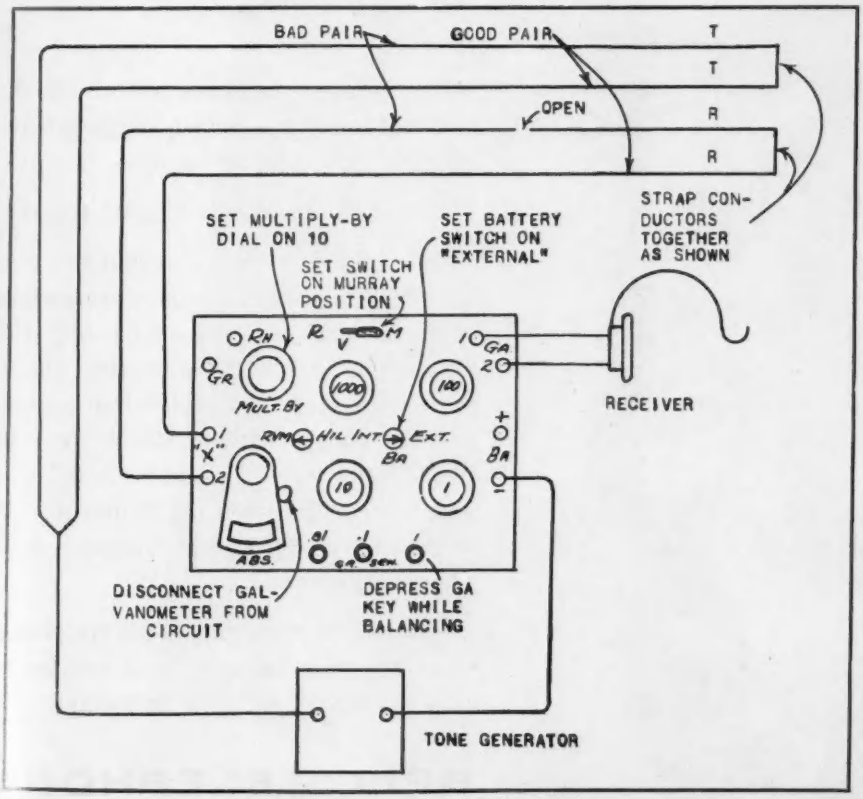


Diagram of connections for locating open in cable conductor, using wheatstone bridge and cable tone set.

Whether it's tool belts or safety straps . . . pliers or wrenches . . . grips or climbers, linemen and electricians know they can expect the highest in quality when their equipment carries the name Klein.

For more than a century Klein has been the leader in designing and producing tools and equipment to serve the exacting needs of the utility field.

Today, wherever power lines or communication lines are strung, Klein tools and equipment are in greater demand than ever, assuring safer, speedier line construction and operation.

WRITE FOR FREE TOOL GUIDE
A free copy of the new Klein Pocket Tool Guide will be sent on request.

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Telephone companies do a big business in smiles

Our industry can take pleasure in the fact that telephone service brings so much happiness to so many people.

Smiles are one of our biggest items!

So what better way to start a new year than by reminding customers everywhere of the fun they can get from friendly telephone visits? That's why this month you'll be seeing a full-color Bell System advertisement entitled "Reach for your phone and have a happy time." It's appearing in national magazines read in areas served by all of America's telephone companies.

The more our customers use the phone, the more they enjoy it, and the better they realize the value of the service.

BELL TELEPHONE SYSTEM

TELEPHONE ENGINEER & MANAGEMENT's

PLANT MAN'S "SPEC" BOOK

(18) Dial Hand Test Set For Locating Faults

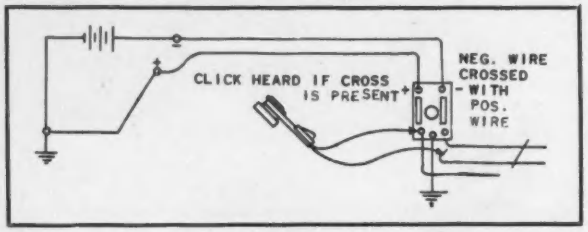


FIGURE 17.

To check for crossed conductors, connect the conductor just tested to its protector terminal (*Figure* 17) and connect one test clip to the third conductor. Touch the other clip to first one and then the other line terminal on the protector. Touching positive terminal checks for cross between the ground conductor of the station wire and the negative side of line. Touching negative terminal checks for cross between this conductor and the positive side of line.

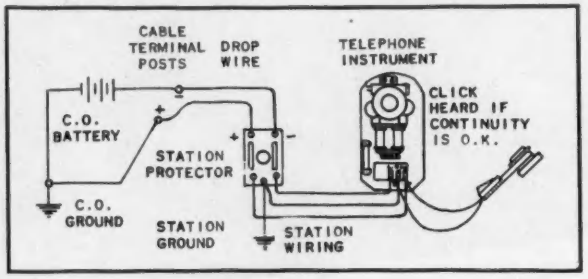


FIGURE 18.

TELEPHONE ENGINEER & MANAGEMENT's

PLANT MAN'S "SPEC" BOOK

(19) Dial Hand Test Set For Locating Faults

To test the station wiring for opens, connect the test set across line terminals of the telephone set, as shown in *Figure* 18. Dial tone or battery click indicates the line conductors of the station wire are not open.

Connect one test clip to the ground terminal of the set. With the other clip, touch first one and then the other line terminal. Battery click on touching negative terminal and line hum on touching positive terminal indicates the ground conductor is not open.

Testing the Telephone Instrument

The method of using the dial hand test set in checking a telephone set will differ somewhat with the type and make of set. However, the same basic method of dividing the telephone circuit into its principal parts for testing each separately is applicable to practically any standard telephone instrument in common use in common battery and dial exchanges.

The testing method discussed in the data sheets applies to a recent model of the Automatic Electric anti-sidetone type dial handset telephone. By experiment it was determined that the circuit of the set (*Figure* 19) could be separated into several principal parts, as shown in the following discussion. The corresponding schematic diagram has been discussed (*Figure four*).

The first step is to check the continuity of the line to the subscribers telephone. Remove the handset from the cradle to close the switch contacts. Bridge the test set across the line terminals and lis-

TELEPHONE ENGINEER & MANAGEMENT's

PLANT MAN'S "SPEC" BOOK

(20) Dial Hand Test Set For Locating Faults

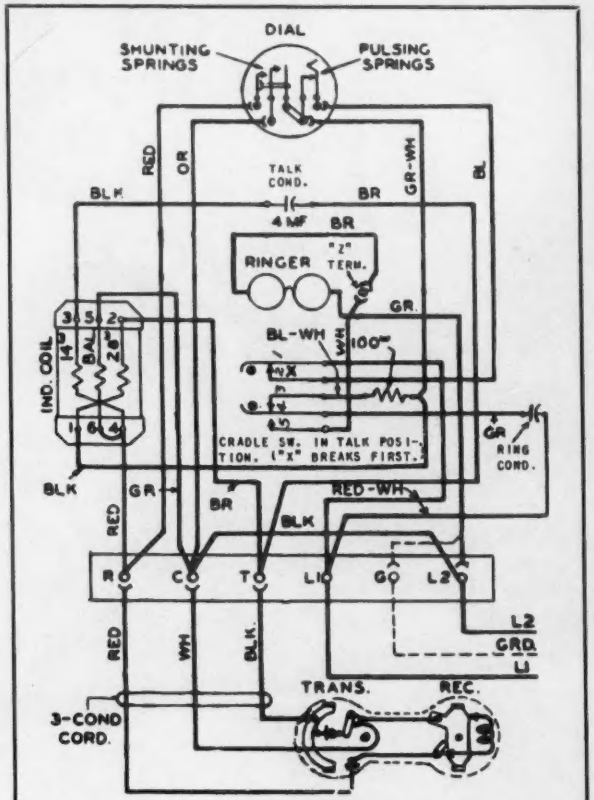


FIGURE 19.

More Data For Your "SPEC BOOK" on Page 60.

More Data For Your "SPEC BOOK" on Page 60.

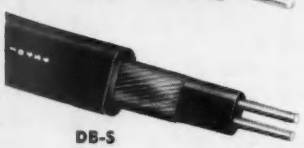
TEL-U

RDC

TEL-CW

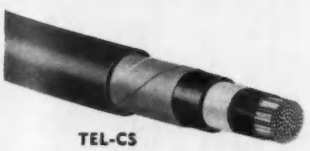
COMPOSITE

PLW


DB-S

DB

TEL-PCP


TEL-CS

From Aerial to Direct Burial

. . . it's ALL available from

SUPERIOR!

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PLANT MAN'S "SPEC" BOOK

(21) Dial Hand Test Set For Locating Faults

ten for dial tone. Then move the dial on the test set off normal. This should stop the dial tone. If the dial tone will not stop, check for loop or negative ground.

Connect the test set to the ground terminal and the line terminal which is on the positive side of line. Line hum indicates no nearby ground on positive side of line and also shows that the ground lead is not open.

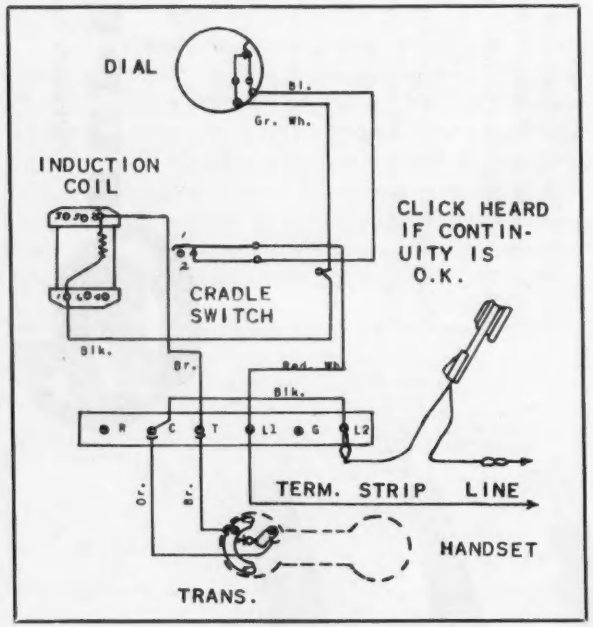

FIGURE 20.

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After this preliminary test, check the outer or primary circuit of the telephone set. Remove the handset from the cradle to close the cradle switch contacts and disconnect the station wire conductor from L-2 terminal. Connect one test clip of test set to this conductor. Connect the other clip to the L-2 terminal, as shown in *Figure* 20. This will cause dial tone to come on if the circuit is good. This connection checks the continuity from L-2 terminal through transmitter, primary winding, dial impulse springs, cradle switch contacts 1-2 to L-1.

Dial the digit "1" to stop the dial tone and tap the telephone set transmitter. The transmitter should sound clear, and not noisy. A dead transmitter may be due to crossed shunt springs in dial.

Move the telephone set dial off normal and tap the transmitter. The transmitter should sound dead. A live transmitter with the dial off normal may indicate the shunt springs in dial are not making.

Operate the telephone set dial. Listen for dial impulses in the test set. They should be clear and even. Uneven impulses would indicate unsatisfactory operation of dial and improper adjustment of dial springs. No impulses heard may be due to crossed impulse springs, or to shorted ring capacitor in the dial filter circuit.

To check the continuity of the inner (secondary) circuit, have the test set connected as in the previous test, but with test clip ready to touch L-2 terminal.

Disconnect handset cord conductor from C terminal (*Figure* 21) and touch L-2 terminal with test

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(23) Dial Hand Test Set For Locating Faults

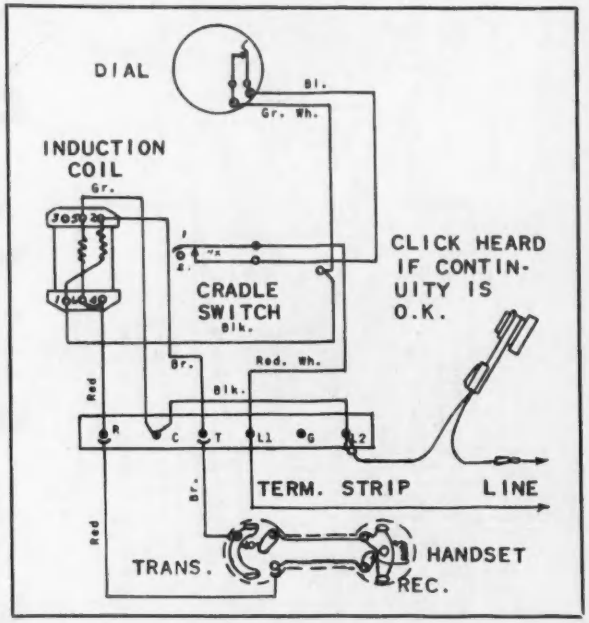

FIGURE 21.

clip. Battery click in the test set indicates continuity from L-2 terminal through third winding, receiver, transmitter, primary winding, dial impulse springs, cradle switch contacts 1-2 to L-1 terminal.

The new "Plant Man's 'Spec' Book" Will Appear in each issue of "Telephone Engineer & Management."

More Data For Your "SPEC BOOK" Will Be In The Next Issue.

More Data For Your "SPEC BOOK" Will Be In The Next Issue.

the connections as shown on Page 55. Locate tone set as far away from the bridge as possible to avoid tone pick up and interference.

With the "Multiply By" dial set on 10 (100 or 1000 if necessary) and the switch on "Murray," depress the galvanometer button and adjust the rheostat dials "1000," "100," "10," and "1" in that order till minimum volume of the tone is obtained. Take measurements from both ends of the cable section and use the readings in the following equations to obtain the distances to the fault.

$$f_1 = \frac{2LA}{A+R_1} \qquad f_2 = \frac{2LA}{A+R_2}$$

$$d_1 = \frac{Lf_1}{f_1+f_2} \qquad d_2 = \frac{Lf_2}{f_1+f_2}$$

L = Length of cable in feet
A = "Multiply By" dial setting
R_1 = Reading at sheath opening end
R_2 = Reading at terminal end
f_1 = Factor for R_1 reading.
f_2 = Factor for R_2 reading.
d_1 = distance to open from sheath opening end
d_2 = distance to open from terminal end

An example of how the calculations would be made is as follows:

Let L = 500 feet; A = 10; R_1 = 22; R_2 = 36
Then:

$$f_2 = \frac{A+R_2}{2LA} = \frac{10+22}{2\times500\times10} = \frac{32}{10{,}000} = 217.13$$

$$d_1 = \frac{Lf_1}{f_1+f_2} = \frac{500\times312.5}{312.5+217.13} = 295 \text{ ft.}$$

$$f_1 = \frac{2LA}{A+R_2} = \frac{2\times500\times10}{10+36} = \frac{10{,}000}{46} = 312.5$$

$$d_2 = \frac{Lf_2}{f_1+f_2} = \frac{500\times217.13}{312.5+217.13} = 205 \text{ ft.}$$

The distance from the sheath opening to the open is 295 feet and from the terminal at the other end to the open, 205 feet.

When the length of the cable is greater than 500 feet, the overall distance may be determined from the cable plat, and the bridge readings used to figure the approximate fault location. Another sheath opening is then made in a place near the figured location estimated to place the fault between the two sheath openings.

The final location is obtained by *accurately* measuring the distance between the centers of the sheath openings and taking bridge readings from each opening for calculating the distances to the fault.

Either method will locate the open in the conductor exactly or within a few inches. It is very important that a good tape be used in the measurements when accuracy is called for. The bridge must be set on a rubber blanket or dry wood plank to minimize leakage effects. The cable conductors should be connected directly to the bridge. If leads are needed for the connection, four leads of *equal* length should be employed. In this case, the length of the *one* lead is added to the overall cable length between testing points.

EDITOR'S NOTE

Got a problem?? Write it down and send it to John S. Reed, Technical Editor, "Telephone Engineer & Management," 7720 N. Sheridan Rd., Chicago 26, Ill. We'll do our best to give you the correct answer.

QUESTION: — *What sizes of multiple distribution wire are standard for rural and town use? I note that there are variations in the color code of the conductor insulation. What is supposed to be standard?*

ANSWER: — There is a variety of multiple distribution wires currently available in sizes from one-pair up to 16 pairs and in 19, 22, and 24 conductor gauges. *Table One* lists the more recent types of rural and urban wires, the latter intended for town use, principally for temporary service in expanding areas.

The 12 and 16-pair distribution wires are bunched in 3- and 4-pair groups in stranding around the support wire to facilitate terminating work. These groups are separated by means of binders.

The R.E.A. has a tentative proposal to use the sizes of multiple distribution wire shown in *Table Two* as standard.

The insulation on the support wire and on the individual conductors has always been black polyethylene. The jacket on each tip or positive conductor is black polyvinyl. The same plastic coating is used on the ring or

TABLE ONE: RURAL and Urban Wires

Type of Dist. Wire	No. of Pairs	Conductor Gauge	No. of Pair Groups	No. of Pairs Per Group	Support Wire Size Inch	Support Wire Breaking Strength-lbs.
"D" Rural*	6	19	—	—	.109	1,800
"E" Rural	12	19	4	3	.120	2,200
"C" Urban**	16	24	4	4	.109	1,800
"D" Urban	16	22	4	4	.120	2,200

*Formerly "B" rural wire
**Formerly "B" urban wire

TABLE TWO: — Standard Sizes of Multiple Distribution Wire as Proposed by REA.

No. of Pairs	Conductor Gauge	No. of Pair Groups	No. of Pairs Per Group	Support Wire Size Inch	Support Wire Breaking Strength lbs.
2	19	—	—	.109	1,800
4	19	—	—	.109	1,800
6	19	—	—	.109	1,800
12	19	4	3	.134	2,700
12	22	4	3	.109	1,800
18	22	6	3	.134	2,700

Let's Make All These E

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IT'S A FACT: color phones help convince subscribers of the need for extension phones.

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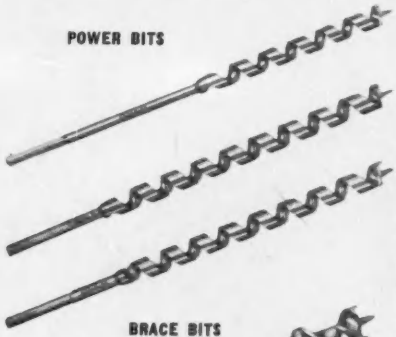

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TABLE THREE: — Color Code

Pr. 1 — Blue-White	Pr. 10 — Slate-Red
Pr. 2 — Orange-White	Pr. 11 — Blue-Black
Pr. 3 — Green-White	**Pr. 12 — Orange-Black
Pr. 4 — Brown-White	Pr. 13 — Green-Black
Pr. 5 — Slate-White	Pr. 14 — Brown-Black
*Pr. 6 — Blue-Red	Pr. 15 — Slate-Black
Pr. 7 — Orange-Red	***Pr. 16 — Blue-Yellow
Pr. 8 — Green-Red	Pr. 17 — Orange-Yellow
Pr. 9 — Brown-Red	Pr. 18 — Green-Yellow

*Last pair of 6-pr. distribution wire.
**Last pair of 12-pr. distribution wire.
***Last pair of 16-pr. distribution wire.

negative conductors but color coded. The latest established color code is shown in *Table Three.*

Any desired color code arrangement is available to the telephone company that requests it.

QUESTION: — *When placing plastic jacketed cable, our men have experienced a rather severe shock on cutting through the jacket at a splice point. Would that be a static shock, and, if so, what causes it? What should be done to avoid this shock hazard?*

ANSWER: — This condition is a static charge produced by the friction of the cable passing through the cable guide and temporary rings or blocks. The metal shield, when it is not grounded, accumulates an electric charge which may build up to the point where it can produce a strong shock on contact. A simple remedy is to clip a test cord to the cable messenger and push the point of a test prod on the cord through the jacket to contact the inner shield.

"Man she's sure got the equipment."

This contact should be made as near as possible to the cutting point and inside the area of the jacket to be removed to avoid the necessity for taping the pricked jacket. This grounding measure is not necessary if the cable is not cut for half a day or more following the completion of the cable pulling operation, since the charge will leak off to a negligible value by then.

QUESTION: — *Is it practical for a small or medium sized telephone exchange to use an emergency generator?*

ANSWER: — A good deal depends on the reliability of the commercial power supply. If you are located where power outages are apt to be prolonged as in hurricane or severe glaze areas, the central office battery will be subjected to heavy recharging periods.

There is also the inconvenience and hazard to personnel in the central office with the power for lighting, air conditioning and other equipment gone. Dependable standby electrical plants are available for operation from natural gas or other fuels.

For example, a 3200 subscriber exchange makes use of a 15 KW standby plant to provide emergency power for charging the central office battery, operating the ringing machines as well as supplying power for electric lights and air conditioners. Transfer control equipment enables rapid shift from commercial to emergency power and vice versa. Many companies make use of portable emergency gasoline driven generators for transportation to stricken exchanges when a permanent emergency plant is not justified. — *John S. Reed.*

Personal Signaling

(Continued from page 32)

age pattern due to shielding and reflection effects of the tower.

The pocket radio receivers used in the personal signaling system, which are completely transistorized, are the same as those employed in the Allentown installation.[2] A photograph of one of these receivers is shown in *Figure Two.* They are manufactured by the Stromberg-Carlson Co. under the trade name of Pagemaster — Model TR-303. Each receiver is a self-contained unit which, including a clip for fastening the receiver to a pocket, measures 1¼ by 2⅜ by 5⅞ inches and weighs approximately 8 ounces. The receiver is powered by replaceable mercury cells which are capable of operating the receiver for approximately 900 hours.

The receiver is of the superregenerative type. The audio-frequency part of the circuit includes four tuned reeds operating in the frequency range from 160 to 300 cycles per second. When these reeds vibrate in proper sequence in response to an incoming signal, an audio-frequency oscillating circuit is energized. The output of this circuit is connected to a magnetic type hearing aid speaker, contained in the receiver case, which operates to alert the customer until a reset button on the receiver is operated.

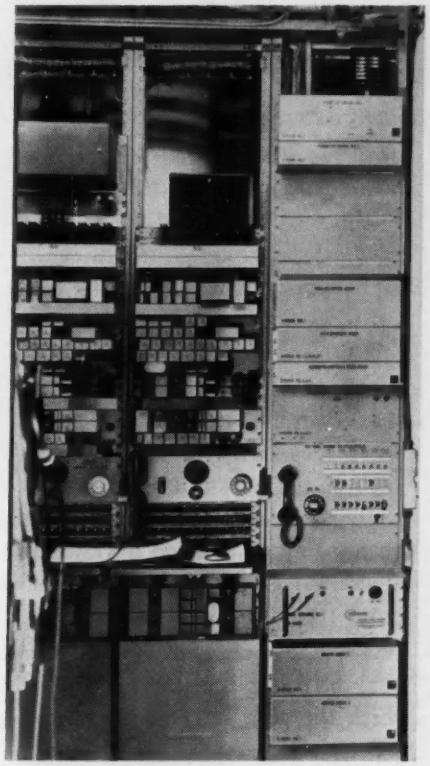

FIGURE THREE: — Signaling control terminal installed at Columbus, by Ohio Bell Telephone Co.

Turn to page 66

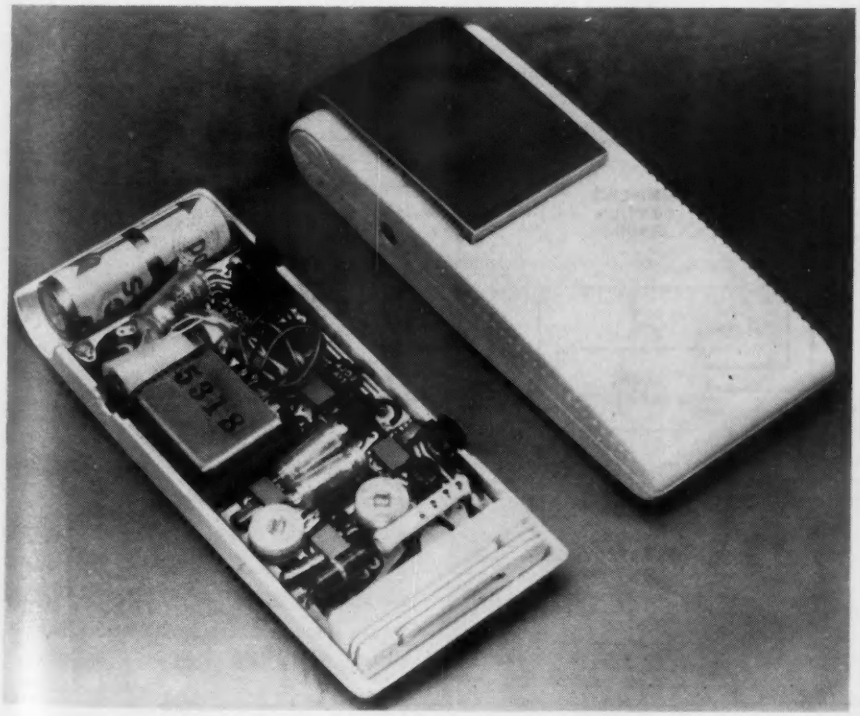

FIGURE TWO: — Personal radio signaling receiver.

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(Continued from page 65)

The Signaling Control Terminal is the brain of the signaling system. This terminal was designed and manufactured by the Stromberg-Carlson Company in accordance with requirements specified by the Bell Telephone Laboratories. It consists of a number of circuit plates or panels of equipment. These are mounted on a standard channel type relay rack. In Columbus, this rack is located beside the G2 Control Terminal with which the signaling system is integrated. A photograph of the installation is shown in *Figure Three*. The signaling terminal is the bay on the right.

A block diagram of the terminal is indicated in *Figure Four*. Included are two registers, an identifier and timing circuit, a tone generator, a signaling control circuit and a transmitter control circuit. In addition, there is a test and supervisory circuit and an associated test panel.

Only one transmitter control circuit is used for the Columbus installation since, in this case, only one radio transmitter is employed for the signaling system. However, the control terminal has been designed to function on an optional basis with a number of transmitters or groups of transmitters which may be required to provide the desired coverage. These transmitters or groups may be energized and signals transmitted from them in turn to prevent signaling interference to receivers which may be located in areas of overlapping transmitter coverage.

After a call is stored in a register, an indication is given by the signaling control circuit in the terminal to the interlock circuit.

As previously explained, the interlock control circuit returns an indication to the signaling control circuit to start the transmission of signals. After assurance that the radio transmitter is radiating carrier, the stored pulses in the register are translated to the four-tone signal and the four tones are transmitted through the transmitter control circuit and over a transmitter trunk to the radio transmitter.

The four-tone signal is sent out from the transmitter three times, after which the code is removed from the register. If there is a stored code in the second register or, as soon as one is received from the switchboard, the interlock circuit is interrogated and the new signal transmitted as soon as the radio channel is available.

To meet FCC requirements, the Signaling Control Terminal contains a station identifier and timing circuit. This circuit functions in connection with the other equipment to connect signals consisting of the call letters of the radio station in international Morse code to the transmitter trunk 30 minutes after the first personal signal is sent out or, as soon thereafter as the radio channel becomes available.

The identification signal is also radiated three times. Following the next transmission of a signaling code a new timing cycle is started. The station identification signal is thus repeated about every 30 minutes as long as the signaling system is in operation.

The test and supervisory circuit includes circuitry for supervising, monitoring and testing the entire system. These functions are facilitated by means of a test panel which contains a dial and handset together with a number of keys and supervisory or trouble lamps.

— To be concluded in the February 15 issue of "TELEPHONE ENGINEER & MANAGEMENT. Part II will discuss: Radio Coverage; Channel Sharing, and Operating Experience.

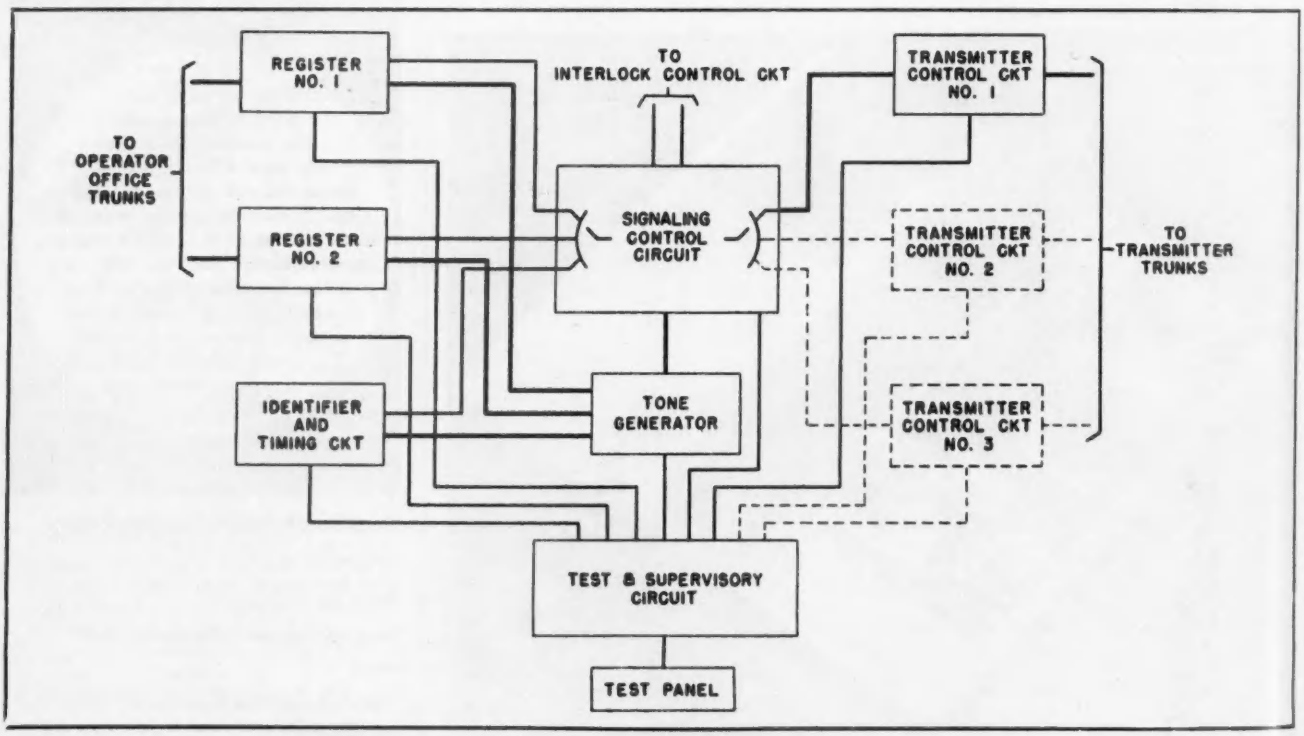
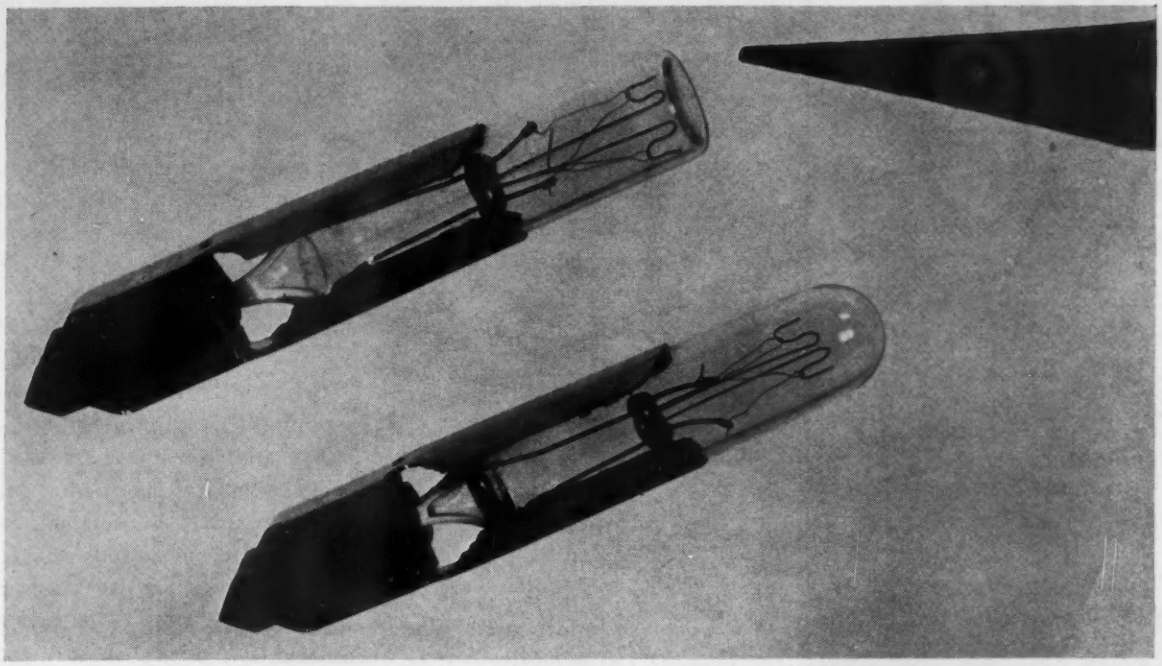


FIGURE FOUR: — Block schematic — signaling control terminal.



A new look in tiny telephone switchboard light bulbs has resulted in a drastic increase in the amount of usable light emitted. The new shaped bulb, developed by Westinghouse Electric Corp., has a flat top which permits the filament to be positioned close to the end of the bulb. The change results in a 60% increase in end footcandles. This means that panel and switchboard indicator lights will be far brighter and easier to see without any increase in bulb wattage. In telephone switchboard and panel applications, only the tip of the T2 bulb is exposed. Lamp performance, therefore, is judged by the amount of light emitted from the end of the bulb. The new bulbs are interchangeable with the conventional type panel lamps. For further information, *Check New Product 108.*

NEW PRODUCTS' SHOWCASE

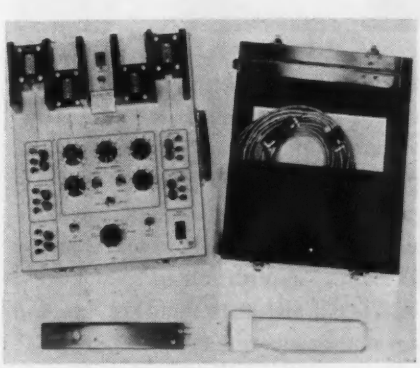
By DICK REYNOLDS

Repeater Test Unit

A LIGHT weight telephone repeater test unit (RTI 0230), using normal repeater networks for strapping instead of patching an external network for verifying repeater gain, has been announced by the Hallamore Electronics Co., a division of The Siegler Corp.

In making line impedance and return loss measurements, or for maintenance of telephone circuits, the RTI 0230 can be used with Western Electric E-type or Automatic Electric transistor repeaters. Unit checks series and shunt connected repeaters for insertion gain either separately or in combination (either an E-2 or E-2-3 circuit) when working between their normally connected line impedances. Standard test equipment, (conventional AC-VTVM and audio oscillator) is all that is required for measurements. A plastic bound chart for making phase angle determination is included with the unit.

The RTI 0230 is housed in a carrying-case-type cabinet and has a single control panel containing function switch, decade controls, line connections and repeater plug-in connectors. Unit is 16⅜ in. long, 14⅝ in. wide and 6¾ in. deep and weighs 20¾ lbs. For further information, *Check New Product* 109.



Repeater Test Unit.

New Corner-Strip

NEW CORNER-Strip designed for use with Panduit Plastic Wiring Duct facilitates duct installation and provides smooth rounded corners at all duct junctions. It is a plastic right-angle piece, slotted at each side of the angle bend to receive the side walls of connecting duct sections. The slots incorporate an overlapping leg design which allows quick, easy attachment, yet grips the duct firmly and securely.

Corner-Strip is made of the same high temperature polyvinyl chloride plastic as Panduit Wiring Duct. This

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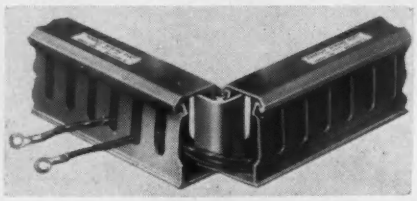
STEWART BROTHERS
Division of Instrument Laboratories
Chicago 10, Illinois

material is non-flammable with no after-glow. It is flexible, tough and durable. No fiber fillers are incorporated, therefore, corner strip cuts clean and does not support fungus growth.

It is supplied in five foot lengths and is cut with a fine-tooth saw to correspond to any duct height. Corn-



ers for any of the nineteen sizes and three types of Panduit Wiring Duct can be fabricated from just this one style of Corner-Strip.

For complete information, *Check New Product* 110.

Communications System

THE 911 VHF Communications System, a thin-route carrier-on-radio package providing four to eight voice channels for quick and economical installation, is the newest addition to Lenkurt Electric Co's. line of telecommunications systems.

The carrier-radio package offers flexibility in its combination of narrow-band FM radio equipment with

certain standard Lenkurt carrier equipment. In addition to voice channels, it can provide order wire, control and supervision circuits. The features of the Lenkurt 911 system, together with its light weight and easy installation, make it adaptable to permanent application to light traffic toll routes and to temporary use for seasonal or emergency requirements.

Permanent applications could link offices to each other, or to isolated settlements or branching routes, with small groups of toll-quality circuits. A typical four-channel arrangement, provided by combining the radio equipment with Lenkurt 45CX carrier, occupies only two square feet of floor space and about four feet of rack space. It can be pole-mounted in a weatherproof cabinet. The eight-channel system uses Lenkurt 33B carrier.

When ordered as a system, the equipment is shipped as a factory-wired and tested package ready for installation, making it ideal for providing circuits to summer resorts, construction sites and military installations, and for emergency restoration of service. The transmitter-receiver and power supply, together weighing only 120 pounds, are common to the several optional forms in which the 911 package is available. The radio equipment may be operated anywhere from 148 to 174 mc at the 50-watt power output. The 119-db system gain offers maximum span length with low signal-to-noise ratio.

For complete information, *Check New Product* 111.

Frequency Changers

SYNCHRONOUS motor driven frequency changers with 400 cycle, 3 phase, output are now available up to 250 KW from Kato Engineering Co.

The company has manufactured 400 cycle generators and motor-generator sets in smaller sizes for several years. Recent demands for larger 400 cycle sources are responsible for the design of the larger machines.

The unit shown on page 70 consists of a 150 KVA, unity power factor. 120/208 volt, 3 phase, 4 wire, 400 cycle alternator mechanically connected in tandem to a 250 HP, 440 volt, 3 phase, 60 cycle, 1200 RPM synchronous speed drive motor. The construction of this unit is typical of the larger units. Both motor and alternator are dowelled to the structural steel base to insure accurate alignment.

The control cubical contains all necessary metering, circuiting, and synchronous motor starter for the motor. A matching panel, not shown, contains necessary automatic voltage

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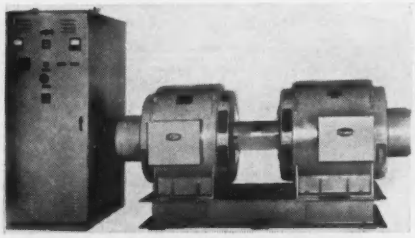


Kato 400 Cycle Generator.

double cubicals as required. For complete specifications of the unit shown, *Check New Product* 112.

Safety Tread Marine Ladder

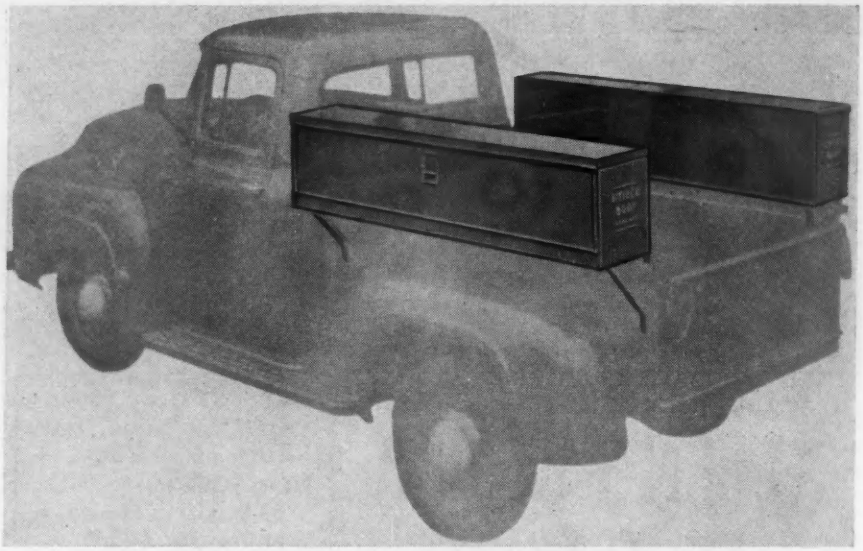
A NEW flat step marine ladder designed for safety and to withstand hard usage has been announced by The Cleveland Ladder Co., Inc.

The ladder is constructed with side rails of sitka spruce or west coast hemlock, reinforced with aircraft cables, hand rails of 1½" diameter maple, linseed oil treated, strong steel

Safety tread marine ladder has new safety features.

boots, all metal parts plated and with the all new wide aluminum safety tread step.

The new steps are a one piece raised serrated stamping that forms a strong grated surface. It has a 55% open area which will not allow snow, sleet or ice to build up and the tooth-like projections assure a firm non-slip surface for boarding. For additional information, *Check New Product* 113.



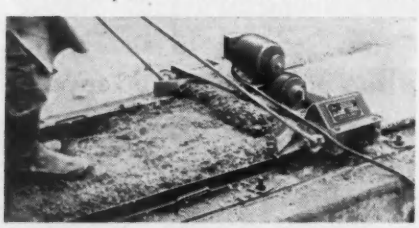
UTILITY BODY COMPANY'S Series TC-Tool Compartments are designed for universal mounting on any pickup truck or flat bed vehicle. Fabricated of heavy gauge steel and electrically welded into compact compartments they are so constructed you can buy them individually or in pairs depending on your requirements. They convert an ordinary truck into a versatile service vehicle by adding lockable and protected carrying space for tools, parts and other equipment without sacrificing your loading area. The Series TC is available in two sizes. Order Model TC-72 for ½ ton pickups and Model TC-84 for ¾ ton pickups. There is additional optional equipment available with the series TC-Tool Compartments. Complete mounting instructions are furnished so that you can transfer the compartments to another truck. For further information on Utility Body's Series TC-Tool Compartments, *Check New Product 114.*

New Vibratory Screeds

TWO NEW vibratory screeds designed for finishing prestressed concrete sections, utilizing Thor's high frequency slapping action to vibrate, compact, and level concrete in one operation, have been announced by Construction Equipment Division of Thor Power Tool Co.

The two new Thor screeds are Model FSM-4, which is 4 feet long, and Model FSM-6, 6-feet-long. Two sizes are designed for finishing conventional channel, double-tee, and other precast sections. Both models have Thor's "two-beam" construction with steel strapping vibratory mechanism.

With Thor's new screeds for precast work, an electric motor actuates



a series of steel straps between the two beams, the resultant slapping action forcing out water and air and producing dense, compact, hard-surfaced concrete. Tests in the production of thousands of square feet of prestressed concrete sections have shown the new Thor screeds to be exceptionally low in maintenance because of their simplicity of design. For further information, *Check New Product* 115.

Liquatite Flexible Conduit

NEW LIQUATITE Type L. A. with a continuous copper wire incorporated in the core carries Underwriter's approval as required in various code specified installations. Liquatite Types H. T. and L. T. both meet J.I.C. Specifications, the former designed to withstand temperatures as high as 220° F., the latter intended for general duty normal usage.

All Liquatite Flexible Conduit is made from heavy, spirally-wound, square-locked galvanized metal and is either cord or wire packed for consistent bending diameters. The extruded polyvinyl jacket protects wiring from oil, chemicals, water, corrosive fumes, weather and other possible injurious elements or conditions. Wires pull easily through the smooth interior, and the flexible construction, using standard fittings, simplifies installation while still giving maximum

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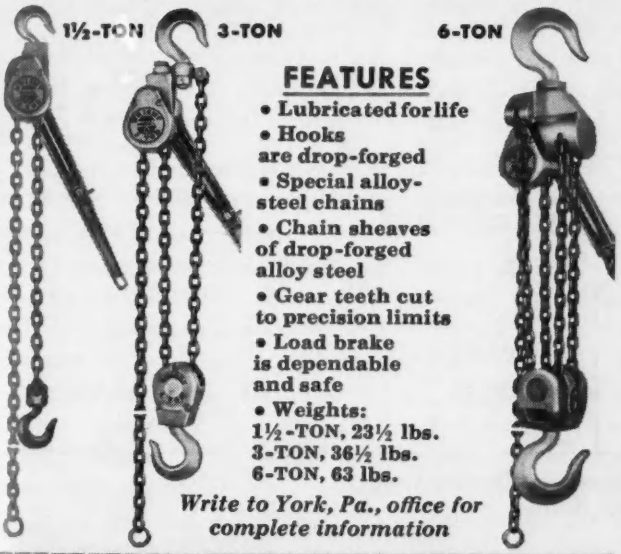

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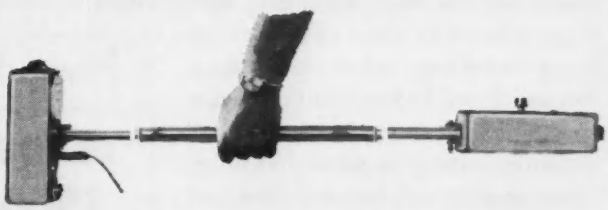
This radically new, powerful, transistorized instrument accurately spots and indicates depth of all sub surface installations. Weighs only 4 pounds. One fourth the size of old type locators.



It's as handy as a flash light. Transistors rarely need replacing. Mercury cells outlast old type batteries at least ten times. The instrument cases are molded glass fibre. The aluminum connecting handle telescopes to 17". The entire instrument comes in a substantial carrying case. Designed and constructed to give satisfaction for many years.

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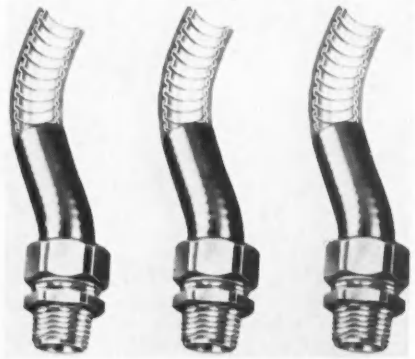
protection against shorts or other wire damage. This flexibility also, of course, absorbs any inherent motion or vibration encountered.

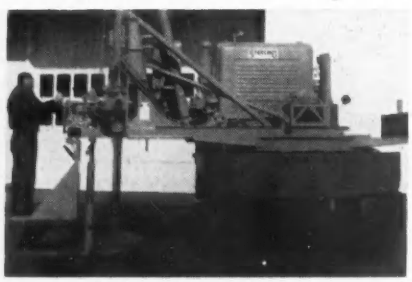
Liquatite is available in snarl-proof



payout cartons or non-returnable reels, in black or machinery gray or in special order colors. For complete information, *Check New Product* 116.

Earth Boring Machine

WYOMING VALLEY Equipment Division has introduced its new Model B Sterling Earth Boring Machine. Designed specifically for the heavier duty requirements of power utilities, the Model B incorporates



improved, heavier and more rugged engineering features such as the larger 2½" x 2½" seventeen foot digging bar (25' bars available); a larger working barrel permitting more pressure hydraulically; heavier ring pinion gears; a larger, heavier aluminum tube pole setter and many other mechanical features designed for utility digging under conditions considered extreme. For further information, *Check New Product* 117.

New Warning Sign

A NEW "Men Working" sign has recently been developed by T. J. Cope Division Rome Cable Corp. The sign panel, balanced vertically and allowed to swing, will withstand extremely high winds.

The legs of the sign are of angle iron 1¼" x 1¼" x ⅛". After galvanizing, assembly is done with stainless steel rivets and brass screws. The yellow panel is 18" x 18" with black letters 5" high. Also provided is a

flag holder of iron pipe. The sign folds into a flat unit for easy transport. It weighs 25 lbs. Special reflective panels can be ordered for night work. For further information *Check New Product* 118.

Strowger Switch Cover

IMPROVEMENTS in the design of Strowger switch front covers have been announced by Automatic Electric Co.

The new covers are easier to remove and replace, and are interchangeable with nearly all covers in the field.

In the new design, the elimination of hooks has made possible a cover which will mount universally — that is, one which with equal ease will fit selector shelf switches, or connector shelf switches of equal height. Because the covers are made from heavier gauge sheet steel, horizontal embossed stiffening ribs are no longer necessary. Finger grips also are eliminated in the new covers.

The cover is held in place at the top of the switch by means of a formed lip at the rear of the cover-top. The lip fits over the switch base flanges. At the bottom, two projections, integral parts of the cover, fit behind the lower cover plate.

The repeater cover incorporates these new features: heavier gauge sheet steel; formed lip at the rear of the top; elimination of the finger grips, and of the two top cover hooks. The lower hooks of the repeater cover have been retained as the most practical means of securing the cover to the relay base and at

the same time permitting 100 per cent interchangeability without affecting the universal mounting feature. For further information, *Check New Product* 119.

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COURTS and COMMISSIONS

by JOHN G. REYNOLDS

FCC rules that lease-maintenance arrangements between Southern New England Tel. Co. and two Connecticut mobile radio licensees are in violation of the 1956 Bell System — Justice Department Consent Decree.

Decision Gives FCC Position on Mobile Radio

IN ITS first formal interpretation of the 1956 Bell System-Justice Department consent decree, as it affects mobile radio service, the FCC has held that in addition to barring the provision of radio equipment and maintenance service by Bell System companies to new customers on an unregulated basis, the 1956 antitrust judgment also precludes the expansion of service being provided under lease-maintenance contracts signed with customers prior to the decree.

The Commission's position was discussed in a decision holding the Southern New England Telephone Co. to be a "subsidiary of the American Telephone & Telegraph Co. for purposes of the consent decree," and ruling that lease-maintenance arrangements between Southern New England and two Connecticut mobile radio licensees "are in violation" of the decree.

The Commission said it construes the section of the consent decree dealing with private mobile systems as having the purpose of allowing "a five-year period within which AT&T and its subsidiaries may orderly terminate its activities in the lease and maintenance of facilities for private communications systems."

Concluding that the decree prohibits additions to existing systems during the five-year period, the FCC declared that "It is our opinion that to permit (Southern New England Telephone Co.) to increase its investment in the particular lease-maintenance activity would do violence to section V(d) of the decree. It should be observed that no undue hardship results to the licensee/lessee from this holding, for during the five-year period the licensee/lessee may continue its lease-maintenance contract with (the Southern New England company) as necessary to its original private communications system."

On the subject of mobile telephone service, the Bell System has stated that its "principal interest" in the frequency spectrum between 25 and 890 megacycles — the subject of a pending overall FCC investigation — "is in connection with public mobile telephone service," and the System is "pressing vigorously" in the 25-890 mc proceeding "for sufficient frequency space to serve large numbers of customers in the metropolitan areas."

In a statement on the subject, the Bell System said by taking its position "we are not opposing the allocation of frequencies for miscellaneous common carriers or privately-owned systems," but "On the contrary . . . we are proposing to the Commission that some of the frequencies now allocated for public mobile service be released for allocation to other services."

In the statement, the Bell System declared that "We believe that people should be permitted to have the same nationwide telephone service when they are on the move — in cars or trains or ships or airplanes — as they have when they are in their own homes or offices. We believe there is a large potential market for public mobile telephone service — a market that is today virtually untapped. We believe that this untapped market presents an almost unprecedented opportunity to the electronics industry, as well as the telephone industry."

The statement also emphasized the "need for adequate telephone communications in vehicles used for business purposes," adding that "Of similar importance, and with undoubtedly an even greater total potential, is the need and convenience of having telephone service in passenger cars. Today the cost of public mobile service makes passenger car use unattractive. In addition, the speed and quality of the service is far from what customers are accustomed to in their homes and places of business. But just as today almost 80% of the homes have telephone service and 75 of families own a car . . . It seems a certainty that with good service and attractive rates a large proportion of passenger cars will have a telephone just as they have so many other accessories."

Required in a "nationwide public mobile service," the statement went on, are "an overall system design;" "cheap and good radio gear;" and "a suitable block of frequencies."

The "telephone industry's part of the overall program," the Bell System said, "would be about as follows: (1) providing the base station radio gear; (2) providing the control gear at the base stations necessary to tie the trunks to and from the mobile units into the overall network; (3) establishing — in company with the people who will build the mobile units — those design requirements which are essential to let the mobile units operate as part of a nationwide system; and (4) providing an identification means for insertion in or association with the mobile set to alert the specific car that a call is coming in and for proper charging.

"A big part of (the overall) job would be the responsibility of the radio and automotive industries. It is obvious that the mobile radio units must do things that they do not do now and they must be considerably cheaper than they are now. However, given a huge potential market, the radio industry would certainly bring

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this about. As far as the Bell System is concerned we hope that the radio and the automobile industry and other industries will design, build, merchandise, and service two-way mobile radio units in the same way as they do for broadcast receivers or other optional features in automobiles.

nance of the hundreds of thousands our job is to do those things which are necessary to make the overall system work; we hope — and believe — that the radio manufacturing, automobile, airplane, and other suppliers and various radio servicing organizations can effectively do the detailed design and manufacture and maintenance of the hundreds of htousands or millions of radio units that will be required."

W. Va. Commission Delays Rate Ruling

- **Telephone Utilities of W. Va. testifies higher rates are needed to obtain REA loan.**

THE WEST VIRGINIA Public Service Commission has continued a hearing on the request of Telephone Utilities of West Virginia, Inc., for authority to increase rates to customers in Webster and Lewis Counties, W. Va.

The company testified that higher rates are needed to get a loan from the Rural Electrification Administration to pay for conversion to dial service. Exchanges at Webster Springs and Cowen in Webster County and Walkersville, Lewis County, would be affected by the change and increased rates.

The PSC indicated it will reopen the case sometime next fall to learn what progress the company has made toward converting to the dial system. The commission, however, probably will notify the company sometime soon that it will authorize the rate increase, which will satisfy the demands of the Rural Electrification Administration.

The dial system is expected to be ready for operation in the three communities by December. Telephone Utilities told the commission its proposed rate increase is for that time.

The proposed monthly rates in-

clude $4.75 for a residential one-party line, $4.25 for a residential two-party line, $7.50 for a one-party business line, and $6 for a two-party business line.

West Coast Tel. Protests Oregon Rate Decision

- **West Coast Telephone Co. operating head, in commenting on rate decision, declares Oregon Commissioner disregarded conclusions of own experts.**

THE WEST COAST Telephone Co., Everett, Wash., declared Dec. 16 that Oregon Public Utility Commissioner Howard Morgan, in an order granting the company $440,000 of an $834,000 rate increase requested for its Beaverton, Coos Bay, and La Grande districts, disregarded the findings of his own staff and an independent study of West Coast operations ordered by Morgan himself. The study was conducted by the Chicago consulting firm of Sloan, Cook & Lowe, engaged by the Commissioner to survey the company's service in Oregon.

West Coast Vice President and General Manager L. Gray Beck said that the rate of return of 6.15% authorized by Mr. Morgan was "even less than the Commissioner's own expert testified would be fair." The company's filing sought 6.85% to 7%.

Morgan's order was critical of West Coast service, and called on the company to develop a program of improved executive, employe, and customer relations. Beck replied that the Sloan, Cook & Lowe report had four major conclusions: that the company is rendering adequate service, comparable to the average of the leading operating companies in the industry; it has met and reasonably fulfilled an abnormally large demand for service in its territory; with minor exceptions, West Coast is providing sufficient equipment of a high grade and is operating it to good advantage; and its routines and procedures are in accordance with good operating practices.

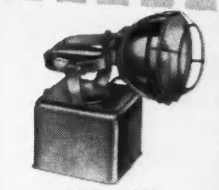
Beck declared that "We are unable to explain the Commisisoner's disregard of the main findings of this authoritative investigation — a disregard that puts the company out on a limb where it does not belong."

N. M. Decision Hits Reimbursement Statute

- **New Mexico Supreme Court declares state statute violates State's "ban on donation of state funds in aid of private corporations."**

THE NEW MEXICO Supreme Court has declared unconstitutional a statute providing for reimbursement to utilities for the costs of relocating facilities due to Federal-aid highway construction (*State Highway Comm.* v. *Southern Union Gas Co.*)

The Court stated the legislation violated the state Constitution's ban on donation of state funds in aid of private corporations. Four other states have construed similar statutes as being constitutional: Maine (132 A.2d 440), Minnesota (91 N.W. 2nd 642), New Hampshire (132 A. 2d 613), and Pennsylvania (*Delaware River Port Authority* v. *PUC*, Sept. 29, 1958). Also in Idaho and Texas,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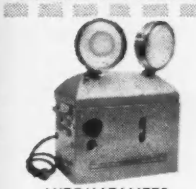
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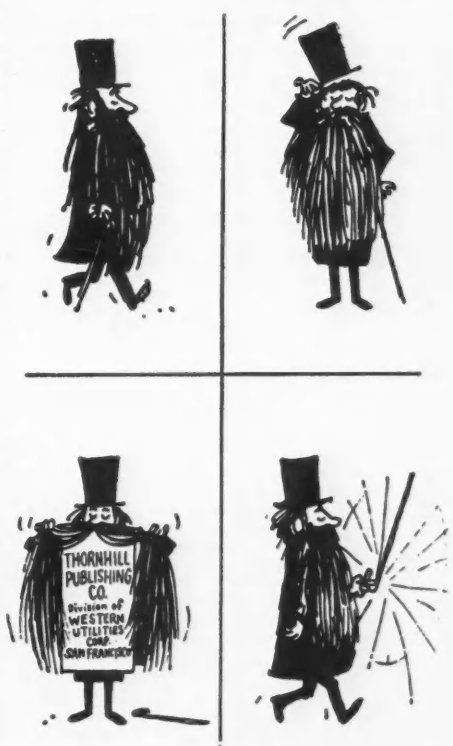

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lower court decisions have upheld the constitutionality of such legislation. Recently, in Tennessee, the Supreme Court in a three-to-one decision decided that such a law was unconstitutional, but a rehearing has been granted.

The New Mexico Supreme Court pointed out that this was a case of first impression in that state, but the case of *Hutcheson* vs. *Atherton*, 44 N. M. 144, 99 P. 2d 462, gave considerable guidance to the Court. In that case it was stated that it is not enough that such a donation of public funds will be used to serve a public purpose. "If this were the criterion by which the validity of an appropriation of public funds is to be measured, there would be hardly any limit upon the right of the state, county, city, or school districts to appropriate money to a private corporation."

A rehearing is being sought in the New Mexico Supreme Court.

Utah PSC Backs Power Firms In Ad Dispute

- **Utah Commission chairman tells Federal Power Commission preventing power companies from charging ad costs as operating expenses would "curtail the rights of free speech."**

UTAH'S Public Service Commission went on record last month in opposition to a Federal Power Commission proposal that would limit "institutional" advertising by private power companies.

The private, investor-owned power firms in the nation oppose the expansion of public power projects. They claim that the public utilities have a tax advantage over the private businesses, and urge this position as national policy in institutional advertisements paid for by the private firms. The private groups have been charging advertising costs as part of their operating expenses — a practice now questioned by the FPC.

Chairman Hal S. Bennett of the Utah commission said if the federal agency prevents power companies from including advertising costs in their operating expenses it would "curtail the right of free speech." He gave the commission's position in a letter to the FPC, which said, in part:

"It is unfair for a regulatory commission to deprive investor-owned utilities of the privilege of bringing facts concerning public power competition to their customers while their competitors (tax-supported utilities) are free to carry on advertising and other similar programs unrestricted."

The Utah commission, he added, had considered the problem and "has determined that Utah Power & Light Co. is not only entitled to but should meet competition of publicity, promotion and advertising on the part of proponents of government power."

Kansas Attorney General Rules On Relocation Payments

KANSAS ATTORNEY General John Anderson has ruled that the state could lose federal aid for its interstate highway system if it reimbursed a utility for highway relocation expenses in violation of an existing contract. The ruling was called for in connection with relocation expenses in Topeka of the Kansas Power & Light Co., which has a franchise in Topeka specifically requiring it to relocate facilities when necessary at its own expense.

PSC Rejects Proposal On Gross Receipts Tax

- **Louisiana commission turns down proposal to pass local gross receipts taxes along to subscribers.**

THE LOUISIANA Public Service Commission has rejected, more than two months after the proposal was presented, a plan under which tele-

"COAST-TO-COAST"

BILL FILED for consideration by 1959 Massachusetts legislature would increase salary of chairman of State Public Utilities Commission from $14,000 to $16,000 & members from $10,000 to $13,000. Measure also would increase terms of commissioners from five to seven years. . . . Ordinances introduced in Baltimore City Council (Dec. 4) would increase from 7½ to 8% the municipal tax on commercial users of gas, electricity, steam, telephones, & fuel oil. Boost would yield about $300,000 in revenue. . . . Extension of 3% state sales tax to telephone service was included among recommendations (Dec. 2) by Michigan citizens advisory committee, headed by State Rep. ROLLO G. CONLIN, Tipton Rep. Study group's program also included proposal to increase from 1.5 to 6.5 mills tax rate for public utilities under state's business activities levy.

Rate increase application has been filed by GENERAL TEL. CO. OF SOUTHEAST with GEORGIA PUBLIC SERVICE COMMISSION. Company seeks increase of about 50% in rates charged for certain classifications of service. Gen. Tel. serves over 28,000 telephones in 35 different Georgia communities. Its largest exchange is at Toccoa, which has about 4,000 telephones.

EARL SCOTT, one of major stockholders of CRESCENT TEL. CO., Erie, Ill., has announced shareholders have disposed of their majority stock interest in company to LeROY T. CARLSON, pres. of NORTHERN ILLINOIS TEL. CO. Carlson has also purchased stock in ALBANY TEL. CO., it is reported. . . . SOUTHEAST DIAL INC., new telephone corporation, purchased ALVIA & SARCOXIE, Mo., exchanges from C. A. McCULLOUGH. . . . Controlling interest in MARION TEL. CO., Worthington, W. Va., has been sold for a reported $95,000. MRS. BERTUS ARTHUR, Moundsville, W. Va., said she sold her interest in the company to JESSIE PARKS, pres., DUNCAN TEL. CO., Davis, W. Va. Duncan plans to form WEST VIRGINIA UTILITIES CO., to operate the exchanges. . . . HIGHLAND TEL. COOPERATIVE has assumed ownership & management of PINE KNOT & WHITLEY CITY, KY., TELEPHONE SYSTEMS. . . . McDONOUGH TELEPHONE COOPERATIVE completed negotiations for purchase of GOOD HOPE & SCOTIA (Ill.) TEL. EXCHANGES.

DAVERMAN BROS., owners of CALHOUN COUNTY TEL. CO., Homer, Mich., purchased ROLLIN TEL. CO., Addison, Mich. . . . MISSOURI PUC aprpoved joint application of PAUL A. and DORIS E. SWEARINGEN, d/b/a CHRISTIAN COUNTY TEL. CO., to sell TWIN LAKES TEL. CO., & to buy telephone properties near Ozark, Mo. . . . Alabama Public Service Commission approved sale of ARITON TEL. CO., to CARL E. KIRK.

phone companies in the state would be authorized to charge subscribers in communities which levy gross receipts taxes on the companies an amount equal to the tax.

Supported by the Louisiana Municipal Association, the telephone companies' proposal was backed particularly by New Orleans authorities. New Orleans has imposed a 5% gross receipts tax on the Southern Bell Telephone & Telegraph Co., increasing the amount from the 2% levy started in 1955, and Southern Bell has challenged the legality of the new tax rate in federal court.

The company has agreed to a compromise settlement if the commission would permit it to pass the tax along to subscribers, but meanwhile, as a result of the pending court case, the city is not receiving the revenues from the levy, although it included them in its 1958 budget.

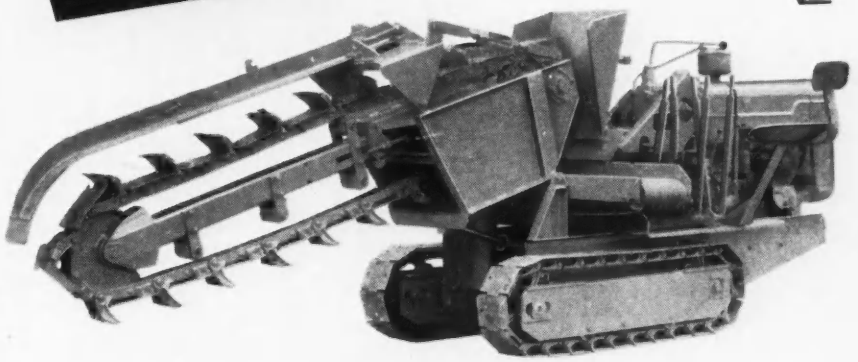
FCC Approves Transfer Of N. D. Services to Co-op

PUBLIC interest certification for the proposed discontinuance of service in Sykeston, N. Dak., when the rural plant there is transferred to the Dakota Central Rural Telephone Cooperative Association, was approved by the FCC last month for the Northwestern Bell Telephone Co. The service area involved is in Wells County about 115 miles north of the South Dakota line and 125 miles west of the Minnesota state line. Northwestern Bell currently serves about 22 rural subscribers in Sykeston.

Southwestern Bell Gets FCC OK for Kleberg Acquisition

THE FCC has granted the application of the Southwestern Bell Telephone Co. for a certificate of public interest in the acquisition of property of the Gulf States Telephone Co. in Kleberg, Tex. Under the transaction, designed to eliminate one of the few remaining instances of duplicate exchange telephone service in the nation, Southwestern is trading a section of toll line to Gulf States in compensation for the latter's exchange properties in Kleberg, serving about 50 subscribers. The greater part of Kleberg lies within the Southwestern Bell Dallas exchange area.

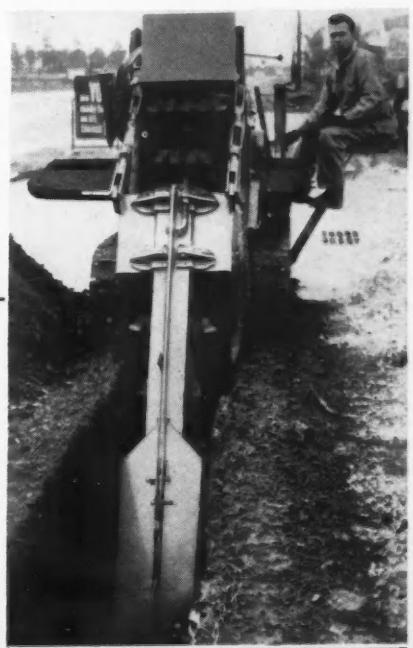
Speed cable installations with little 77 Trenchliner®



Only 3 ft.-10 in. wide . . . 5 ft.-8 in. "low"

- Digs 6 to 18 in. wide.
- Maximum trench depth is 5 feet.
- There are 32 digging speeds from 4.4 in. to 21 lineal ft. per min.
- Shiftable spoil conveyor is instantly reversible for controlled discharge.
- Telescopic, positive down-crowd boom holds accurate grade.
- High-carbon, cast-steel buckets have self-sharpening removable teeth.
- Hinged crumber swings out of way when undercutting or making vertical set-ins.
- Powered by a 46 H.P. gasoline engine.
- All main gears are enclosed in oil bath; all main shafts are on antifriction bearings.
- Weighs approximately 6700 pounds.

Take a look at the latest addition to the big Parsons® line of Trenchliners — the little 77. Not much wider than a yardstick, this new Trenchliner is just right for installation of underground telephone cables and conduits. Compact and maneuverable, the 77 turns within its own length — works easily in congested areas. What's more, it only weighs about 6700 pounds — is ideal for quick, convenient trailer transport from job to job. The tiny 77 is heavy-duty in every respect. Has sloping ladder boom that makes vertical set-ins — undercuts cross-pipes, sidewalks, curbs, gutters. Ask Parsons distributor for a demonstration on your work. Call him today or write to us.



Want more facts?

Mail to: PARSONS Company, Newton, Iowa

Send us bulletin on new 77 Trenchliner

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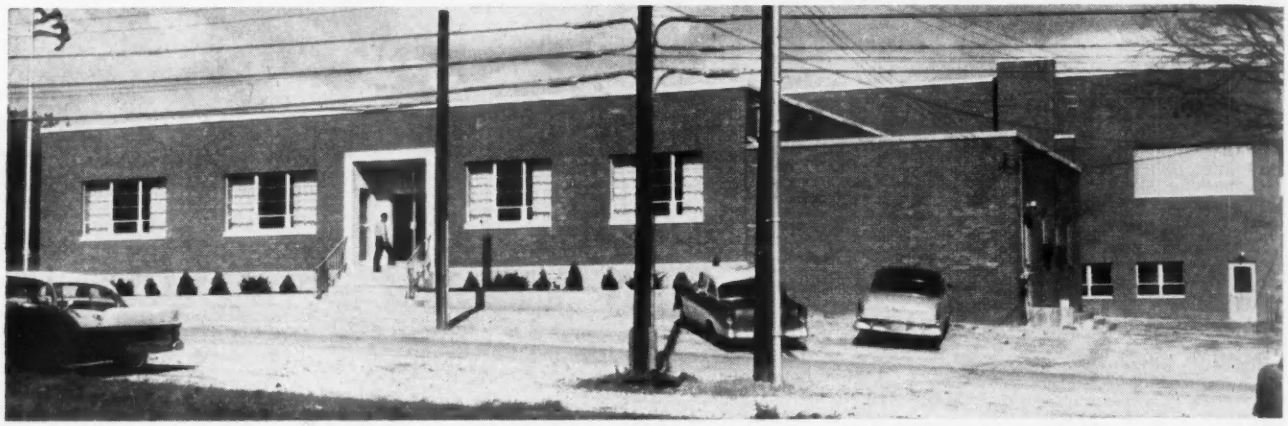


Imposing front of The Murraysville Telephone Co's. new office-plant, Export, Pa.

industry NEWS briefs

Modern Office-Plant Shows Progress of Murraysville Tel.

FOLLOWING about five years of unique growth, the Murraysville Telephone Co. recently moved into a new ultramodern office at Export, Pa.

According to company president, Harold G. Payne, Architects Bowers & Petite of Altoona and Wilkes-Barre, Pa., designed the impressive $325,000 building. An initial maximum of 6,000 lines will be provided for in the new building — far cry from the 360 lines operated five years ago by Murraysville Telephone Co. Due to the good potential of the expanding economy of the surrounding rural area, the new building design will accommodate a new wing for another 6,000 lines.

The Murraysville Telephone Co., incorporated in 1905, like other rural areas experienced a slow growth period. Harrison City, Claridge, Export, Murraysville, Sardis and Mamont were served from two exchanges located at Export and Murraysville.

As the company started to expand it became necessary to establish a common battery office at Newlonsburg which was considered to be the wire center at that time. In 1952, when control of the company changed, there were approximately 1700 stations in service.

A year after this change in ownership, the Delmont Rural Telephone Co. was acquired by the same group and it was at that time that Telephone Utilities of Pennsylvania, Inc., was incorporated for the purpose of carrying out the necessary financing to rehabilitate and modernize both telephone properties. Meanwhile, management went ahead with expanding holdings in Western Pennsylvania and West Virginia rural areas.

Steady acquisition and internal growth of TUP marched the total of stations served to upwards of 19,000 as this is written. Monthly station growth has run about 100 stations. And during the organizing and expansion, dial conversions, and general modernization of facilities, The Murraysville Telephone Co. went to the drawing boards with ideas and engineering plans and work began under the direction of Chief Engineer and Vice-President Leo R. Glahn, for the ultimate conversion of Export and the construction of the new office.

The new structure, a three-level concrete block building with brick veneer front, affords the company about 24,000 square feet of inside area.

Chief Engineer, LEO R. GLAHN, left, confers with Murraysville Telephone Co. president, HAROLD G. PAYNE, in the latter's new executive office.

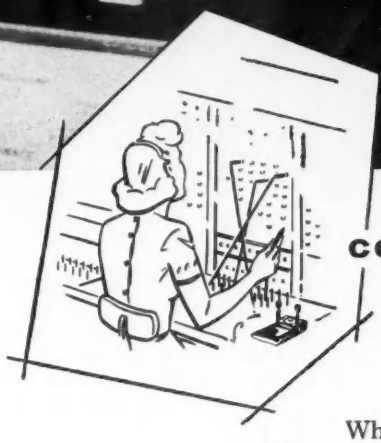
Hopedale Tel. Closes $100,000 Long-Term Loan

THE HOPEDALE Telephone Co., Rock Creek, Ohio, has been granted a long-term loan in the amount of $100,000, according to President William McClusky. Part of the loan will be used to retire interim financing of $85,000 provided by The Chase-Manhattan Bank.

McClusky and his family are

CALCULAGRAPH'S NEW 60-minute dial . . .

SIMPLIFIES TOLL CALL RECORDS



CONVERT YOUR SWITCHBOARD NOW!

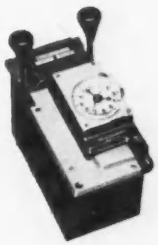
Busy telephone operators are finding the new Calculagraph 60-minute dial *easier to use* and they can now handle more calls more efficiently.

Why? Because they don't have to remember to stop and add 30-minutes to long conversations. This new 60-minute Calculagraph dial does it for them.

This new Calculagraph 60-minute dial assures you, too, of *all charges* due on every call. If you now have 30-minute dials, you can convert your Calculagraphs to the 60-minute dial.

Whether your needs can be met with either the 30-minute or 60-minute dial you can be assured of *100% accuracy* on *all toll calls* with Calculagraphs on *your* switchboard.

Write today for complete information.



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Still in service after more than twelve years . . . that's the exceptional record of WB Reinforced TELEPRENE Drop Wire . . . and there's only one reason . . . quality. By cutting drop wire replacement to the bone with Reinforced TELEPRENE, Whitney Blake has proved that even if you could get drop wire for nothing, unless it stands up as long as WB TELEPRENE, service calls and replacements would cost you more.

INDEPENDENT

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This wire is REA approved

1-8

WELL BUILT WIRES SINCE 1899

WHITNEY BLAKE COMPANY

NEW HAVEN 14, CONNECTICUT

owner-managers of The Hopedale Telephone Co. near Steubenville, Ohio, and also of The Citizens Telephone Co., Rock Creek, Ohio. The Hopedale exchange has grown from 345 subscribers at the time of acquisition by the McClusky's in 1953 to nearly 700 at present.

General of Calif. Files Stock Offering Statement

GENERAL Telephone Co. of California last month filed a statment with the Securities & Exchange Commission seeking registration of 500,000 shares of 5% cumulative preferred stock, $20 par, to be offered for public sale. The company said proceeds will be used for its program for expansion and improvement of service.

Dickson Group Handles Carolina Tel. Offering

R. S. DICKSON & CO., Inc., and associates last month handled the public offering of 13,190 shares ($2,070,830) of Carolina Telephone & Telegraph Co. common stock following clearance by the Securities & Exchange Commission.

The Dickson group obtained the shares through the exercise of rights won at competitive bidding. Southern Bell Telephone & Telegraph Co. was the seller. The group's bid was $5.816 for a right to buy Carolina Telephone common stock on a 1-for-5 basis at $125 a share.

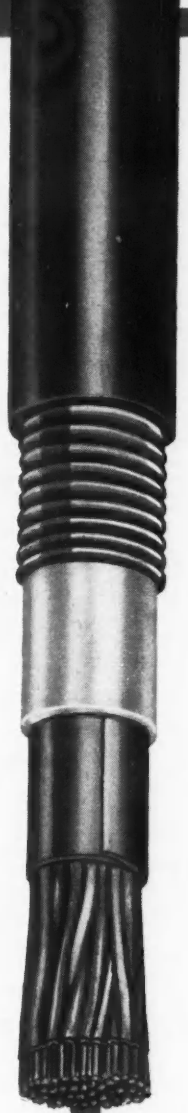
Competing bids came from Kidder, Peabody & Co. with a bid of $4.829 and from Goldman, Sachs & Co. with a bid of $3.75.

So. Bell Accepts 4.61% Interest Cost on Debentures

LAST MONTH Southern Bell Telephone & Telegraph Co. accepted a 4.61% annual interest cost to sell its $70 million block of AAA-rated debentures, due December 1, 1993.

That cost is higher than the 4.52% Pacific Telephone & Telegraph Co. is paying for the $80 million it raised Nov. 18, 1958 on securities ranked a notch lower on the investment scale —AA-rated 4⅝S due November 1, 1990.

Southern Bell issue went to under-



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FULLY COLOR CODED

FOR AERIAL AND DUCT TO REA SPEC PE-22
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WRITE FOR CATALOG — CONTAINS COMPLETE DATA AND SPECIFICATIONS FOR ALL REX TELEPHONE WIRES and CABLES.

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THE REX CORPORATION
100 Hayward Road, West Acton, Mass.

INDEPENDENT

writers led by Halsey, Stuart & Co., Inc., on their bid of 100.3199 for a 4⅝% coupon. A competing bid of 100.22 for the debentures as 4⅝S came from a Morgan Stanley & Co. group. The successful bidders put the securities out for general distribution at 101.307, to yield 4.55%.

The $70 million of 4⅝S will be optionally redeemable by Southern Bell at prices ranging from 106.31 down to par. Ben S. Gilmer, president, said the proceeds will be used in the company's expansion program "to meet the continuing telephone demands in the South."

AT&T Directors Announce Plan to Split Stock

THIRTY-SEVEN years of continuous dividend payments at the $9 annual rate begun in 1922 will end next July 15 when well over 1,600,000 American Telephone & Telegraph Co. shareowners receive dividend checks amounting to $9.90 a share on the present stock, it appeared certain Wednesday, Dec. 17, when the AT&T Board of Directors voted to recommend a three-for-one stock split for shareowner approval at the 1959 annual meeting next April 15.

The stockholders are expected to approve overwhelmingly the board's proposed action which would distribute three shares for each one now held, at one-third the present $100 par value, about next June 1. Dividend payments would be $3.30 a year, or 82½ cents a quarter, on the new shares.

In a statement, the Board of Directors said it "believes that the proposed action will make the company's shares attractive to more investors and therefore widen the market for the company's stock. It will strengthen the position of the company in competing for the large amounts of equity capital that will be needed in the future to meet the nation's requirements for telephone service in our expanding economy.

"For the past three years, the Bell System has spent two billion or more dollars per year for new construction. The major part of this has been raised through the sale of securities. Expenditures of this magnitude are expected to continue. This is considerably more than has been spent by any other privately owned corporation. It has furnished employment to many thousands of people and has had a beneficial effect on business conditions throughout the country.

"If the company is to continue these large and important construction programs, a broader market for the company's stock is essential."

The decision of the board to split the stock, "thus bringing the company's stock within the purchasing power of an entirely new segment of the public," was described by President Joseph A. Beirne of the Communications Workers of America in a statement Dec. 19 at "a turning point of tremendous significance."

Beirne declared that "There were great pressures on top management to operate within the strict confines of its long established stock policy. There were also great pressures on

Please turn to page 86

CROSS-COUNTRY BRIEFS

OHIO CENTRAL TEL. CO. moved 35-ton brick building, which will house new telephone exchange, from Mason to South Lebanon, Ohio. Building was loaded on truck in Mason & towed. . . . Familiar green color used by NORTHWESTERN BELL TEL. CO. on its outdoor equipment is giving way to yellow in certain cases as safety measure. Company has started gradual changeover to new "highway yellow" on its cable splicers' trailers, telephone pole trailers, cable reel trailers, manhole heaters, manhole guards, air compressors & other equipment. Reason for change to yellow is that green blends in too well with the terrain under certain conditions & is difficult to see.

MAX MOORE, manager of ETEX TEL. COOPERATIVE, INC., Gilmer, Texas, announced that due to change in REA policy, members signing up for telephone service will no longer be required to furnish equity in order to secure telephone service. $10 membership fee is still required, but this amount puts telephone in members house & no further payments are required for installing phone. . . . SMALL TELEPHONE company that serves farm homes in sections of three Virginia counties stands to strike a bonanza with advent of jet airport at Chantilly. PIEDMONT TEL. CO., with 1,200 subscribers & nine employes, holds franchise for largest part of airport territory, which lies in Loudoun County. STANLEY A. OWENS, commonwealth attorney of Prince William County, is mgr. & principal stockholder PIEDMONT TEL. CO.

Stockholders of GENERAL TEL. CORP. & SYLVANIA ELECTRONIC PRODUCTS will vote at special meeting recently scheduled for Feb. 11 on proposed merger of SYLVANIA into GENERAL. . . . Senate Judiciary subcommittee on Constitutional Rights did not resume scheduled hearings on wiretapping last month. Inability to arrange schedule convenient to witnesses & committee members was given as reason for cancellation. Subcommittee aide said hearings may be resumed early in '59. . . . Advance program for Feb. 12-13, 1959 Solid State Circuits Conference, to be held at University of Pennsylvania, Philadelphia, lists technical contributions from more than dozen Bell Telephone Laboratories engineers & scientists. Laboratories Pres. M. J. KELLY has been invited to address conference at its opening.

WELL-QUALIFIED by his professional engineering background, DR. JAVIER BARROS SIERRA, former Dean of College of Engineering at National University of Mexico, has been appointed Secretary of Communications in new President's cabinet. Secretary of Communications has responsibility of overall direction of Mexico's telecommunications. In telecommunications field, Mexico has extensive nationwide government telegraph system. Its telephone service is operated in Mexico City Federal District & in 496 exchanges throughout nation by TELEFONOS de MEXICO & a smaller telephone company in Tijuana. Government telegraph system linking every city and town & even villages, is both wire & radio. Department of Communications also has jurisdiction over civil aviation & railroad communications installations in sphere of authorization & inspection. Other major segments of the Secretariant's responsibilities are Mexico's highways & public works. . . . Dec. 2 was big day for Dell City, Texas as community's first telephones went into service. JACK LYNCH, pres., DELL CITY TEL. CO-OP, said new service connects nation's "largest isolated community" with "Texas and rest of nation."

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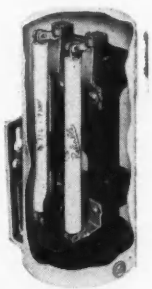
SUPPLY LINES

SUTTLE — Suppliers of Equipment to Telephone Men — Since 1910

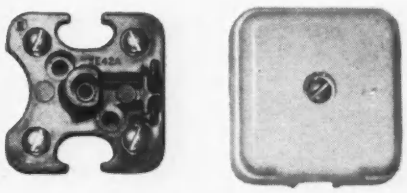


SIMPLE TO INSTALL NON-RUSTING PROTECTOR

The **RELIABLE** 2000 Series Station Protector provides excellent protection against static and crosses with electric circuits. High quality Neoprene base has wire entrance sealing slots; weather-and insect-tight cover. Unnecessary to remove fuses or bracket to wire and mount protector. Clearly marked binding posts are on side opposite fuses. Fuse mount is reversible. In stock *now* at **SUTTLE'S** warehouse.

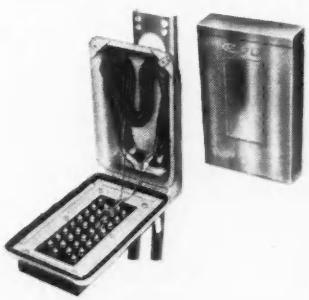
DIAMOND WIRE QUICKLY AVAILABLE

For connecting open wires together or to cable terminals, **DIAMOND WIRE** offers its neoprene covered Bridle Wire. This rubber insulated, soft tinned copper wire offers exceptional strength and holding power. The neoprene insulation is *permanently* welded to the conductor. All types of **DIAMOND** Telephone Wire are stocked by **SUTTLE** in quantity and usually can be delivered immediately. Check **SUTTLE's** prices *before* you buy!



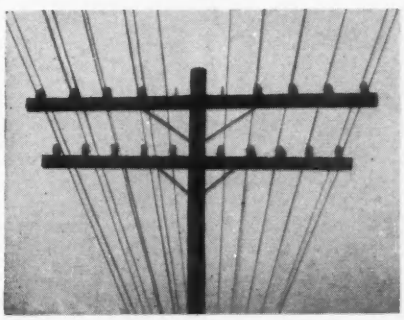
NOW — *PLASTIC* COVERS 4-POINT BLOCKS - .36 EA.

Only **SUTTLE** mfg's. the industry's standard four-terminal connecting block *with non-shorting plastic covers.* Available in brown or ivory, these covers are high dielectric styrene — completely shorting resistant. **SUTTLE** is also your sure source for standard 10-terminal connecting blocks, and three sizes of *plastic* block covers. (SE 44A). For fast delivery of these connecting blocks *and* plastic covers, send your orders today to **SUTTLE,** or your local distributor.



COOK TERMINAL FOR PLASTIC CABLE

Designed and made by **COOK ELECTRIC,** the PLX Cable Terminal is for use on plastic cable which is looped *through* the terminal without cutting the wires and the desired pairs are terminated for distribution. Also used for junctioning and terminating cable. Supplied with or without Minigap or Mytigap arresters mounted in an arrester plate; specify whether or not protection is needed in your order to **SUTTLE.**



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SUTTLE speeds crossarm delivery by using any one of six shipping points. Manufactured by **AMERICAN CROSSARM** to meet full NELA and REA specifications. Arms available in clear grades of Douglas fir, yellow pine and cypress. Regular telephone pony-size arms are stocked in 4, 6, 8, and 10-pin sizes, as well as 10-pin arm with wide spacing in the center. **SUTTLE** also stocks the "REA type" dead-end arm drilled for 10 insulated fork brackets. For prompt delivery, order from **SUTTLE.**

EASY-TO-INSTALL COLOR CODED INSIDE WIRING CABLE

Specify **ANSONIA** Inside Wiring Cable, Type 1255. You get economy plus ease of installation. Conductors, insulated with 12 mils of color-coded plasticized polyvinyl chloride, are paired and cabled with steel rip wire to facilitate stripping. Supplied in 22 and 24 gauge (brown or ivory) vinyl jacket with #29 rip wire. Be *sure* to get **SUTTLE's** quote on your needs.

Manufacturers, suppliers, and printers to Telephone Men Since 1910

For further information, specifications or quotations on these telephone supplies— write, wire or telephone—

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PHONE: LAWRENCEVILLE 782

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EQUIPMENT INSTALLERS — Experienced men with references. Steady work with a reliable, fast growing Corporation who needs good men. Top wages, expenses, and good benefits. Reply to: T.E.I. Corp., 12 East 10th Street, Erie, Pennsylvania.

CABLE SPLICERS. Station Installers, equipment Installers. Linemen, **Experienced men needed. Steady work, good pay.** Henkels & McCoy, 1800 Johnson Street, **Elkhart, Indiana, or 6100 N. 20th St., Philadelphia, Pa.**

MANAGER — To direct personnel in all phases of telephone operation. Fixe exchange 1200 subscriber dial system. Dial C.O. maintenance experience necessary. Write Camden Rural Telephone Company, Camden, Michigan giving photo, experience, salary expected, date available and references.

HELP WANTED

Middle East and Far East overseas assignments now for the following staff positions:

Microwave Engineers
Dial Switching Engineers
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Teletype Engineers
Specification Writers

Long term opportunities in design, construction and operation of complete telecommunication systems. Provisions for family transportation and accommodations available. Normal overseas incentive applicable. All replies held strictly confidential.

Send detailed resume and salary requirements to Box 41, c/o Telephone Engr. & Mgmt.

WANTED: Well qualified cable splicers and helpers. Write: Neale Construction Company, 3100 Topeka Ave., Topeka, Kan.

FOR SALE

MAGNETO TELEPHONES — Leich 901 wall or desk magneto telephones. Cleaned, tested and guaranteed, $16.50 each. As removed from service, $15.00 each, Turtle Lake Tel. Co., Turtle Lake, Wisc.

B. B. WIRE — Reclaimed but in good condition, .06 per lb. F.O.B. Harlan, Iowa. Farmers Mutual Cooperative Tel. Co., Harlan, Iowa. Phone: SK 5-2105.

FOR SALE

DIAL SWITCHBOARDS — North Electric 60 line all relay dial switchboards wired and equipped 60 lines, 6 links arranged for 10 party full selective harmonic divided ring 5 party harmonic bridge ring reverting call by directory number. Write: Box 36, c/o Telephone Engineer & Mgmt.

DIAL TELEPHONES — Used reconditioned dial telephones, Leich, 601 & 605; Western Electric, 302; Automatic Electric, type 40; $11.00 each. ALSO; 1 used ¾ ton truck, with reconditioned motor, new tires, 4 speed transmission; $300.00. Amberg Telephone & Telegraph Company, P. O. Box 66, Wausaukee, Wisconsin.

LOUD RINGING EXTENSION BELLS

With 6-inch gongs & non-magnetic aluminum bells

Available in straight line & all frequency ringing

SPECIAL RESISTANCE QUOTED ON REQUEST

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FOR SALE

SWITCHBOARD — North Electric MCXR1000, Serial No. 200G Switchboard; used 4 years, 400 lines, 11 links per group, 3 PBX groups, 10 pay station lines, 5 outgoing and 4 incoming FS trunks, 9 two-way toll trunks. Also, a North five frequency ringing machine. Available immediately. Can be seen any time at Home Telephone Company, Simpsonville, South Carolina. R. D. Coker, Mgr., Tel. No. WO 3-4400.

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Made for trucks and equipment
Small or large quantities
Write for free catalog.
MATHEWS COMPANY
827 S. Harvey **Oak Park, Ill.**

Available for immediate delivery

550 lines 1200 terminals,
KELLOGG type — 73 crossbar automatic switchboard.
Brand new, never been in service.

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Kellogg #258
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S.C. #135 on 80 Mtg.
W.E. #275 on 217-A Mtg.
W.E. #365 on 136 Mtg.
W.E. #295 on 136 Mtg.
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LAMPS

Kellogg #25
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S.C. #121 on 80 Mtg.
S.C. #121 on 81 Mtg.
W.E. 12B on 137B Mtg.
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★ Cable Multiples can be made to your specifications
★ Line and Cut-off Relays for your line additions

BUCKEYE TELEPHONE & SUPPLY CO.

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BUY NOW & SAVE

MDF PROTECTION

Cook #3800 (2, 101 pr groups) complete with 8 ft. vertical terminal blocks & all fittings. Brand New, factory boxed .....$200.

Cook #3800, 20 pr. groups $20
#100, 20 pr. groups 15
#100, 23 pr. groups 16

Western Electric (fully equipped)
#C 50 A, 50 pr. group 47
reconditioned 35
C 52 A, 52 pr. 49
reconditioned 37
C 25 A, 25 pr. (½ of C50) 20
1268 A, 20 pr. 15
1268 B, 23 pr. 16
1269 A, 20 pr. 15
1435W(1269-A-wood base) 15
1435 U, Fuse group 6

Heat Coils. 76A, new ..... 10¢
($9 hundred, $80 thousand)
#29 Porcelain Discharge Blocks 5¢

FUSES, 35A, B, C, H, S, New, 10¢. ($9 hund., $80 thousand) 75,000 in stock (standard W.E. pack, 10 or 50)

Protected Pole Terminals.
11 pair S-6 Cook, with H-20 protectors. No stub, for Plastic cable, compression gland. New $19.50

Protected Interior Terminals.
Western Electric—all new
LA 16, complete $50
LA 26, complete 65
LA 26 (fuse chamber only) 20
with protection 30
LC 16, complete 45
LC 26, complete 60
LA 51, complete 100
LB 26, fuse chamber only 20
with protection 30

Pole Terminals, with lead Stub
W.E. F-10, 5½ ft. stub .....$ 6
12 ft. stub 7
F-16, 5½ ft. stub 10
12 ft. stub 12
F-26, 5½ ft. stub 15
BD-102, cross-conn 51 pr. or
terminal 102 pr. 100
BD-202, as above 150
BD-404, as above 200
BD-606, as above 250

COOK XB-11, 6 ft. stub $5.
XB-16, 6 ft. stub 8.
XB-26, 6 ft. stub 12.

A.E. 60A type, 16 pr., 6' stub ....$ 8
26 pr., 6' stub 12

Interior, lead stub
W.E. G-11, 6 ft. stub 5
25 ft. stub 8
G-16, bind post chamb. 7
G-26, bind post chamb. 10
H-51, bind post chamb. 20
(12 ft. stub)
E-51, 54" stub 25
50 ft. stub 40

Cook WXB, 6 pr. (less box) 4
WXB, 16 pr. (with box) 8
M-16, 51 pr. 15
Uniflex, 51 pr. 15
Cable vault, 101 pr. 50
(with H-20 protectors) 100
Terra-Term, 76 pr. 35

RUG-11, Reliable, underground.. 15
(stuffing boxes) .....50¢

Frames, MDF, W.E. & Cook
6 & 8 ft., single or up to 5 verticals in unit —save over half.

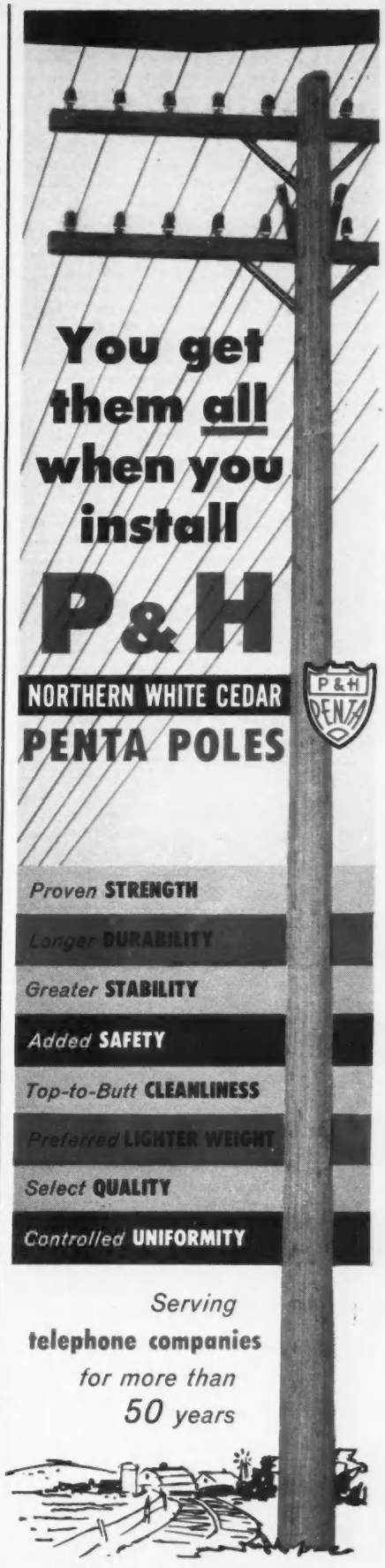
Relay Racks, W.E. etc.
6 ft. to 12 ft., 19-23-26" Terminal Blocks, 6¢ pr.

All New Material (unless otherwise noted) priced F.O.B. Los Angeles
Shipped on Approval — Satisfaction Guaranteed

TELECTRIC CO.

1218 Venice Blvd. **RIchmond 8-2249**

Los Angeles 6, Calif.



ADVERTISING, DIRECTORIES — *General Telephone Directory Co., 1800 Oakton Street, Des Plaines, Ill.*

BELTS — CLIMBERS — COMPLETE LINEMEN'S EQUIPMENT, *W. M. Bashlin Co., Bashlin Bldg., Grove City 1, Pa.*

BOOTHS — Acoustic Telephones — *Sherron Metallic Corp., 1202 Flushing Ave., Brooklyn 6, N. Y.*

BORING MACHINES, EARTH — *Highway Trailer Co., Edgerton, Wisc.*

CORDS, Switchboard (with or without plugs), Instrument (straight and retractable in eleven colors. — *Commercial Cord Co., Inc., 26 Main St., Clifton Springs, N. Y.*

CORDS, Switchboard & Telephone — *Runzel Cord & Wire Co., 4727-31 Montrose Ave., Chicago 41, Ill.*

POLES, Creosote & Creosote Penta-Treated, Southern Yellow Pine — *Piedmont Wood Preserving Co., P O. Box 700, Augusta, Georgia.*

POLES, Southern Yellow Pine — *Taylor Colquitt Company, 217 E. Main St., Spartanburgh, S. C.*

POLES, Southern Yellow Pine — *Texas Creosoting Co., Orange, Texas.*

PROTECTIVE EQUIPMENT — *Reliable Electric Company, 11333 Addison St., Franklin Park, Ill.*

TELEPHONE EQUIPMENT AND SUPPLIES — *Telephone Repair & Supply Company, 1760 Lunt Avenue, Chicago 26, Ill.*

WIRE, Insulated — DATED DROP WIRE — Neoprene or Weatherproof — *Alphaduct Wire & Cable Co., New Brunswick, N. J.*

WIRE, Insulated Drop and Bronze or Copperweld — *Acorn Insulated Wire Co., Inc., 36 Freeman St., Pawtucket, R. I.*

(Concluded from page 82)

management to step forward into the light of a new day in fiscal matters — to split the stock and place it within reach of many thousands of the public who desire to invest in the business. . . .

"With the seal of stockholder approval on this courageous decision made by management, the company will undoubtedly find success in overcoming its financial problems and continuing the expansion of telephone service so vital to all."

ITT Plans Stock Split: Vote Slated for Jan. 22

INTERNATIONAL Telephone & Telegraph Corp. directors last month proposed a 2-for-1 split of capital stock and called a meeting of shareholders on Jan. 22 to vote on the plan.

If the split is approved, the board said, the additional shares would be distributed about Mar. 1 and the first quarterly dividend on the new basis would be made in April at the rate of 25 cents a share. This would be equivalent to 50 cents a share on the present stock. Last month the board declared a quarterly dividend of 45 cents a share, payable Jan. 15 to stock on record on Dec. 22, 1958.

ITT also announced that consolidated net income in the third quarter ended Sept. 30, 1958 rose to $5,667,858, or 79 cents a share, from $3,865,042, or 54 cents a share, in 1957's corresponding period.

Consolidated sales and revenues in 1958's third quarter increased to $171,231,269 from the year-ago quarter's $155,087,008. The report excluded one ITT subsidiary, American Cable & Radio Corp., because of its large minority of public stockholders.

Net income in the first nine months of 1958 was $18,014,686, or $2.51 a share, up from the $16,854,296, or $2.35 a share, of 1957's first three quarters, while nine months' sales rose to $501,689,254 from $482,004,005.

"United States manufacturing and the telephone and radio operating groups continued to show improved earnings during the first three quarters,compared with the like period last year," said Edmond H. Leavey, president.

ITT had $494 million in orders on hand as of Sept. 30, 1958 an increase from $467 million the year before. The 1958 figure, however, did not include "very substantial amounts" for two contracts awarded to ITT recently by the Air Force, Mr. Leavey said. Now under negotiations, the contracts are for an automated electronic control system for the Strategic Air Command and for the mission and traffic control sub-system for the F-108 interceptor.

Executive Appointments Made By York-Hoover Body Div.

CHARLES I. ZIEGLER, president, York-Hoover Corp., York, Pa., has announced the following Body Division appointments:

Charles B. Stratton, registered professional engineer, and engineering graduate of the University of Pennsylvania, is the new plant manager. Prior to his association with York-Hoover, Stratton was employed by Day & Zimmerman Co., Philadelphia engineering firm, where he served as consultant engineer for plant layout and establishment of manufacturing controls. He also performed organizational studies and industrial engineering analyses.

Donald H. Groft, former chief sales engineer of the company, has been promoted to sales manager of the Body Division. Groft is an engineering graduate of the University of Michigan. Prior to becoming associated with York-Hoover in 1945, he was senior project engineer for Chrysler Corp., Dodge Chicago Division. He is a member of the Society of Automotive Engineers.

William E. Ciccarelli, who became associated with the Body Division in 1956, has been appointed chief engineer in charge of design and methods, research and development. Ciccarelli is a graduate engineer from Penn State University. He was formerly associated with the ITE Co., Philadelphia, Pa., in the capacity of chief, research and development. He is a member of the Society of Automotive Engineers.

STROMBERG-CARLSON

Transmitter

A DIVISION OF GENERAL DYNAMICS CORPORATION

News and views of Independent telephone people. VOLUME 7, NO. 10 • JANUARY, 1959

Uranium, oil, zinc in Utah bring

boom times for Midland Telephone Company

One extra man and two pack horses are a relatively humble beginning for a telephone company, but that is what the late J. N. Corbin worked with some 60 years ago to construct lines and organize what ultimately was to become the Midland Telephone Company of Moab, Utah.

Ever since the first telephone line was set up to connect Moab with Thompson, telephone service in Southeastern Utah has grown and improved as the area turned into a bustling center for uranium mining, power, oil and zinc processing.

Down through the years the Corbin family and other officers and directors of the company have kept abreast of improvements in communications and applied them in their operations to keep up with demand for quality service.

The company has had some trying days but the area started to grow soon after World War II. At that time less than 400 telephones were served by exchanges at Thompson, Moab, Monticello, and Blanding, Utah. Later, the company branched out with a toll circuit from Monticello to Dove Creek, Colorado, and installed an exchange to serve about 150 telephones in this community on the western edge of Colorado.

Dial came to Moab in 1949 but the relay dial equipment was soon outgrown and replaced with XY Dial with the capacity for unlimited growth.

The telephone company enjoyed a steady expansion from 1949 to the Fall of 1953; that's when the uranium industry got started here and stimulated activity in oil, power and

"Come in and look around!" And that's what they did at the Monticello "Open House." Interested visitors listen to explanation of dial system given by Paul Hopkins, C.O.E., second from left, and E. D. Corbin, district manager of the Midland Telephone Company.

New building at Moab houses offices and toll facilities, makes excellent background for this happy group: Mr. J. W. (Jack) Corbin, vice president and general manager; Mrs. Corbin; their son, J. Wallace Corbin, plant superintendent; and S. W. Bailey, Stromberg-Carlson sales representative.

Subscribers needed more toll facilities at Moab; Midland Telephone Company installed this Stromberg-Carlson No. 3 Toll Switchboard to take care of present requirements as well as anticipated increases.

other industries already established nearby. Hundreds of people moved into the area, which was growing by leaps and bounds; they brought with them the demand for quality dial service and more toll trunk facilities.

The Midland Telephone Company, under the direction of its general manager, J. W. Corbin, got to work fast: it brought dial to its other exchanges; increased the number of toll circuits connecting communities in Southeastern Utah with Salt Lake City and Provo, Utah, and Grand Junction, Colorado; installed microwave via an 11,000-foot peak to connect Mexican Hat, its southern terminal, with Monticello, at the northern end; increased telegraph facilities; and branched out into a mobile telephone radio service. It brought to 73 the total number of communication outlets serving 2600 subscribers.

Late in 1957 the company began a new building program. The new exchange at Moab houses executive and business offices and new toll board facilities. Monticello recently held "open house" for subscribers to see the new building and the XY Dial equipment which was cut over at the same time. Even now business activity is increasing around Blanding and Buff, bringing another boom time for the Midland Telephone Company.

Midland Telephone Company and Mrs. Corbin know that "Open House" is ideal time to merchandise telephones. If you are planning an "Open House" or cutover celebration and need assistance on displays and publicity, call on your Stromberg-Carlson branch office.

Upgraded PBX service at Crossett, Arkansas

Easy to smile, as only calls requiring operator assistance come through this board.

The phenomenal growth of fabled Crossett and its parent industry has been told often; the accomplishments of Mr. Jack Tucker and his Public Utilities Corporation are also well known in telephone circles. Never one to consider "good" as the equivalent of "best," Mr. Tucker is constantly investigating the needs of his customers, to see if service can be improved.

His studies at the Crossett Paper Company indicated an application for a Type H XY-PBX, with usual attendant's cabinet, for general service. In addition, to improve efficiency within the executive offices, a Stromberg-Carlson F-40 is installed as a sub-system off the main dial PBX.

Because of the chemicals in the air around this plant, the dial equipment building is air-tight, with batteries so housed as to be accessible from the outside.

Roscoe Morgan, plant superintendent of Crossett Public Utilities, cutting in 100-line XY-PBX.

Out goes a manual PBX, in comes efficient F-40 turret for executive office subsystem.

For a diversified pulse source or an accurate pulse measuring instrument, it's the

Portable Pulse Generator and Measuring Test Set

One of the basic ingredients for planned reliability is versatile and diversified test equipment. Versatility aimed towards servicing maximum equipment in a single location and diversity in simulating a variety of operating conditions. Towards that goal, Stromberg-Carlson engineers have developed the No. 19 Pulse Generating and Measuring Test Set.

The objectives in designing the new Pulse Generating and Measuring Test Set were to provide a reliable and variable continuous pulse source needed to trouble shoot and routine equipment requiring a pulsing source for operational checks; and a pulse measuring device needed to accurately check the output of pulsing circuits or components.

Its adaptability as a test unit is easily realized by describing the variety of functions and tests this versatile generator can perform. Its use as the pulse source for the New Portable Equipment Routiner has already been described in the November, 1957, "Transmitter." In addition, Test Set No. 19 will:

* *

Generate pulses ranging from 6 to 25 pulses per second. The adjustable speed range makes it applicable for use in XY Dial central office and toll ticketing pulsing circuits as well as other circuits having similar pulsing requirements. The pulses are autosynchronized to insure full break on the first and succeeding pulses. High quality components, such as the mercury contact relay, insure pulse output stability.

* *

Generate GROUND OUT pulses that may be sent over the tip, ring, or sleeve of the PULSE OUT jack. Facilities are provided to enable the addition of resistance to the output circuit where a resistance ground output is required.

A versatile addition to test equipment in any office. Test Set is only 14½" high, 12" wide, 6" deep; weighs approximately 30 lbs.

Generate CARRIER OUT or lamp resistance battery pulses that may be sent over tip, ring, or sleeve of the PULSE OUT jack.

* *

Generate POLAR DUPLEX pulses. These pulses will be battery and ground alternately and they may be sent over the tip, ring, or sleeve of the PULSE OUT jack.

* *

Generate LOOP pulses or intermittent opening of TIP and RING loop.

* *

Provide facilities for varying per cent make and break time of all output pulses.

* *

Provide proper compensation when reading pulse per cent make in parallel with XY® and Deca® Switch magnets.

Measure speed and per cent break of dialed pulses.

* *

Receive inward pulses and measure their speed range and per cent make or break periods.

* *

Supply pulses to a piece of equipment under test and simultaneously read the pulses as repeated by this equipment to permit accurate pulse distortion measurement.

* *

This unit is applicable in XY Toll Ticketing offices where it can be used to generate and test pulses with dial speeds or for higher speed pulses as found in this system; for general tests and maintenance in any office; or for lining up and checking of inter-office trunk pulsing facilities. Test Set No. 19 fulfills the need for a practical instrument to quickly and accurately evaluate your pulsing circuit or component problem.

Advertisement

Week-end at White Pines Park, near Oregon, Illinois, gave us chance to spread canvas, stretch legs. This is southernmost stand of white pine in U. S.

Wisconsin Independents look to Ray Riordan — Association secretary since 1952 — as a clearing agent for matters of interest to more than one company. Recently he has actively promoted accounting schools, plant management seminars, pension committees, uniform reporting of personal injuries or property damage. Since Ray spends about 40% of his time on the road, the "voice" on the association phone will often be Mrs. Morkri, shown at right.

Miss Edith Johnson came home to Camp Douglas for a vacation 5 years ago, took position as bookkeeper, rose to become manager. Photo shows Miss Johnson and Carl Olsson, plant superintendent, in XY Dial room of New Lisbon.

Mr. B. E. Dahlen (center) manager of Mt. Horeb Telephone Company, with Leo Rubendall (left) and Steve Holum, Mt. Horeb plant superintendent.

What a pleasant surprise to look up from breakfast at White Pines Park and see three charming ladies from Dixon. L-R: Annetta Reese; a camping "hostess"; Savilla Palmer; Esterbelle McClennan, chief operator at Dixon.

Postman's Holiday No. 4

There's a quickening tempo in the Badger State

Ever popular tourists' mecca is Wisconsin Dells, near New Lisbon. To be enjoyed, this glacial gorge, preserved forever in its natural beauty, must be seen from the water.

Imperceptibly Wisconsin had stolen upon us. Physical differences . . . . greener grass, whiter barns, sleeker cattle, cascading hills, do not march to the Illinois line and stop, but gradually are beamed at the screen until the full-focused picture leaps out at you. The anticipation of the less-familiar undoubtedly brightened the pigment on the canvas — certainly our last two days in Illinois had been wonderful and well worth re-thinking.

Just west of *Oregon*, where we had been warmly welcomed at the new and very inviting office of the DeKalb-Ogle Telephone Company, natural beauty has been distilled and protected in one mile-square preserve. White Pines Park recognizes that

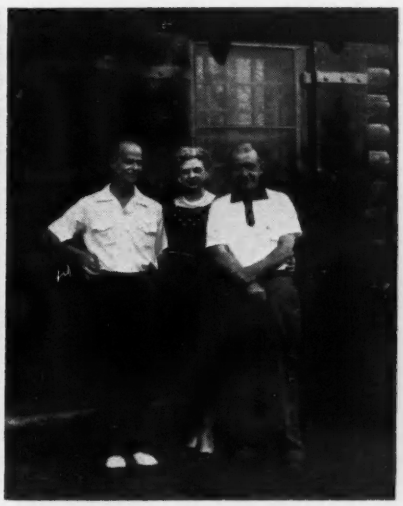
Forward planning. Edith Johnson studies area map of Camp Douglas exchange.

Here's that salesman again! Leo Rubendall dropped in at Middleton while we were there; found colored telephones a "demand" item.

Mr. and Mrs. Ray Riordan of Madison, Wisconsin.

Dewayne Thomason, manager of Farmer's Union Telephone Company of Middleton, welcomes a visitor to this exchange. Since XY Dial was first installed, number of equipped lines has more than trebled.

Editor meets publisher. The Bill Youngs of Rochelle, Ill., call at White Pines Park. Eloise Young is associated with publication of Telephone Engineer magazine.



Glad that XY Dial Systems require less floor space than other dial systems, Mr. Dahlen and Steve Holum measure for new equipment wing at Mt. Horeb.

people have individual tastes in enjoyment of nature: some like rustic log cabins (and we certainly were thankful for one in the first night's cloudburst); others prefer tenting (and we had plenty of company in this the next day). You can burn your own bacon, or be served out-of-this-world food at reasonable prices in the main lodge. Perhaps that's why — as we looked over our platter of pancakes — we saw three ladies from Dixon, who the day before had been giving that superb operator service that becomes a possibility when toll ticketing removes the burden of routine long-distance calls.

Sunday . . . Wisconsin . . . America's Dairyland . . . obviously *milk* to go with our picnic in a roadside park. The request caused consternation! The teen-age car hop, confronted with this incredible order, consulted the head girl, who stage-whispered to the cook, who called the manager. After confirming the description, and after much confusion in the back room, the girl emerged smiling — a root beer carton clutched in her hand. It did contain that precious fluid, milk.

Madison, lapped by lakes on all sides, is always beautiful. With two hours before our Sunday evening appointment with Mr. and Mrs. Ray Riordan, we dug for swim togs, asked a few dozen bathers to move over a little, and sank into the cool depths. Perhaps this chance to refresh helped make our visit with the Riordans more delightful.

Dewayne Thomason, manager at *Middleton*, knows that this suburban community must have service at least the equal of the metropolitan area. One look at his spotless exchanges, where the principal activity is adding new lines and trunks to meet spectacular growth, and you know that this company intends to meet this challenge indefinitely.

The name Farmer's Union Telephone Company — more descriptive when the company was founded in 1901 — would not imply the scope of present business, including several substantial industrial users among the thousands who choose Middleton or Cross Plains for their homes. This was pointed out by Mr. Ray Ripp — secretary-treasurer and a director since 1936.

Mt. Horeb is beyond the commuting area; its progress is that of rural Wisconsin. Mr. B. E. Dahlen has a dial conversion well under way; when the XY Dial equipment is cut in, it will be a far cry from the original service provided by his father and other citizens in 1897. Mr. Dahlen has made his town his life, serving 20 years on the village board — 10 as president.

One should never be surprised to find a woman in an executive job. Miss Edith Johnson of *Camp Douglas* and *New Lisbon* is perfectly cast in the managerial role, yet became the entirely feminine hostess (according to reliable information) when the traveling reporters separated — your editor going on west, the lady waiting for an evening train north.

This delightful section of Wisconsin requires fuller treatment and will be our lead-off as we continue next month.

iddleton, Wisconsin, is thriving suburb of adison, with the telephone company always ced with a growth situation. Business office tiv ties efficiently handled by Mrs. Grymes, rs. Tesch and Mrs. Reisdorf.

Advertisement

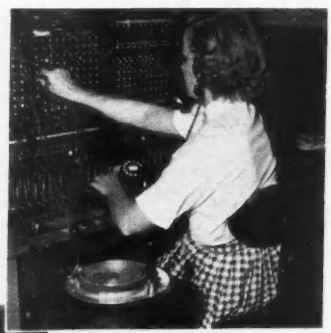
Have good book; please bring slippers! Warren French, Jr., manager of Farmer's Mutual Telephone System, in his office at new Edinburg headquarters. Meeting a big challenge boldly, he's glad to exchange security as transmission engineer in New York City for the rewarding opportunities of improving telephone service back at "home base."

Open House 12 hours after cutover. Just a few of many visitors — this group composed of employees and their families—who crowded Edinburg exchange despite torrential downpour.

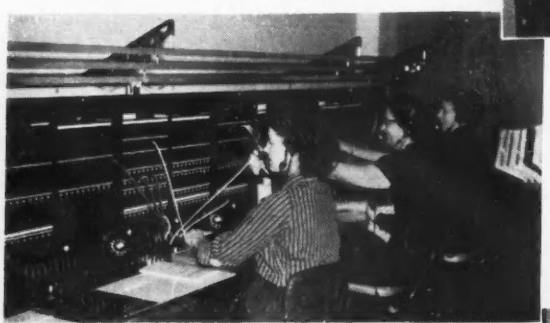
Apples, poultry and tourists are chief sources of income in Shenandoah Valley.

On schedule exactly as planned:

Edinburg, Va., first of large di



Striking contrast between out-dated combination manual board at Newmarket, operated by Gladys Zirkle at right, and new 8-position toll board at Edinburg with (l-r) Helen Palmer, Harriet Funk, the chief operator, and Harriet Maus. At lower right, Mrs. Palmer is giving special service at the DSA board.



This office complete, Lloyd Camp (right) Stromberg-Carlson installation foreman, and crew will move on planned schedule into other offices in the Farmer's Mutual network.

"Mr. French? . . . Glad to meet you. I'm bleeding to death!"

Not the usual introduction of traveling editor and customer manager. Warren French, Jr., of Edinburg, Virginia, quickly dropped his role as cutover host — and proved most adequate in the first aid department — then back to hosting.

Edinburg was chosen as the first of six XY Dial installations to be put in service, because of its central location, making it logical as toll center and headquarters. Our approach — over the redoubtable Blue Ridge Mountains — took us first to Newmarket where a charmingly camera-shy operator pitted dexterity against deterioration for the numbered days of this manual board.

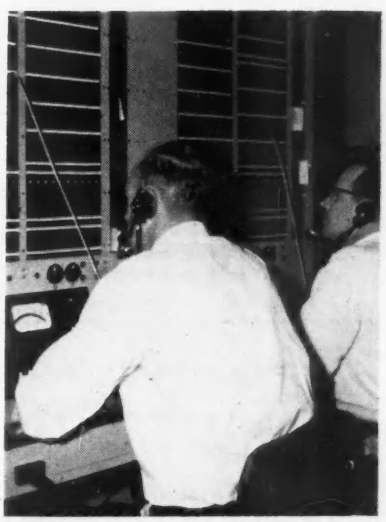
This R.E.A.-financed program is moving ahead on well-planned schedule, town by town on a monthly basis, with Woodstock at the northern end of the valley capping the climax.

Not every manager would hold Open House 12 hours after a 2 A. M. cutover. Warren French chose to do so. Equipment, installers, outside crew cooperated 100% — even the 48-hour deluge proved unable to dampen spirits or degrade service. Congratulations to all on a BIG first step forward.

ed:

arge dial network

Mrs. French, relaxing for a moment at home, after busy day welcoming guests to Open House.



Two-day rain had them worried, but wire chief Joe Schwartz and C.O.M. man Lionel Specht — shown at test board — reported not a single permanent at cut-over . . . . a good indication of the thoroughness of installation and pre-testing.

Photographed on board. RMS "QUEEN ELIZABETH"

"Transmission was perfect," reports Philip Lucier, Stromberg-Carlson telephone finance manager. The call was to his mother (pictured here) and father, Mr. and Mrs. R. F. Lucier of Warsaw, Indiana, who were aboard the "Queen Elizabeth" two days out of New York City. "I originated the call," says Phil, "and contacted the 'high seas operator' in New York. I had the ship in about two minutes; took five more to locate mother, who was at dinner."

Are your subscribers' hands free?

People in Marion, Louisiana, must be extra busy these days. At least, reports from there indicate that they need both hands free to accomplish more while telephoning.

Mr. Clark Williams, manager of the United Telephone Company of Louisiana, asked for three more Hands-Free Telephones recently, bringing the total ordered up to seven in the past two months.

Are you making your customers' hands free?

Effective promotion will sell for you

Volumes are written on the art of selling and effective advertising. We sift through magazines and newspapers for the germ of an idea and invariably we turn to our business associates and ask — how did you do it?

"We thought an attractive display, located in our business office, showing the attractive phone colors that are available, would be very effective," states Mr. John W. Carter, manager of the United Telephone Company of Smackover, Arkansas, "and have also run ads promoting our phones as an excellent gift idea." We congratulate Union Telephone upon taking these forward steps in producing good ideas as well as good service.

There are hundreds of good selling ideas being used today, such as:

— telling the public to avoid steps, even accidents, by using extension phones.

— promoting decorating ideas using colored telephones.

— and — here's an interesting one — an extension phone, instead of a Colt .45 in your dresser drawer, offers security and protection to the bedroom.

We are sure you have wonderful ideas that have proven successful. We would like to hear about them. Somewhere, someone is trying to get *the* idea on how to sell more of his telephones.

Part of an all-out effort to sell colored telephones is this effective display in Union Telephone Company offices for Smackover, Arkansas, citizens to see.

Advertisement

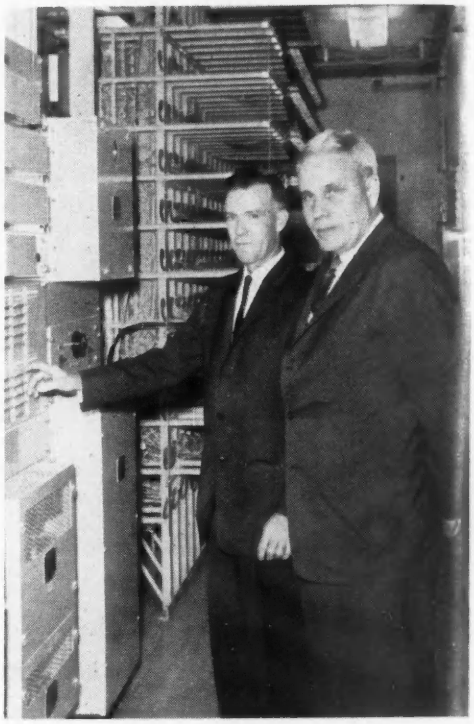
Leader in Blue Earth's planned progress: Eldon Eckles of Minnesota

Mr. Eldon Eckles, president of the Blue Earth Valley Telephone Company of Blue Earth, Minnesota, is also president and general manager of the Eckles Telephone Company of New Prague, Minn. Of all the many trips Mr. Eckles has made to New Prague, probably the most rewarding was when this exchange recently cut its 1,200 stations over to XY Dial. This is the first such dial exchange in the network managed by Mr. Eckles; others are on schedule.

Mr. Eckles is well known in telephone circles, having served as president of the Minnesota Telephone Association, and is still very active on Industry committees.

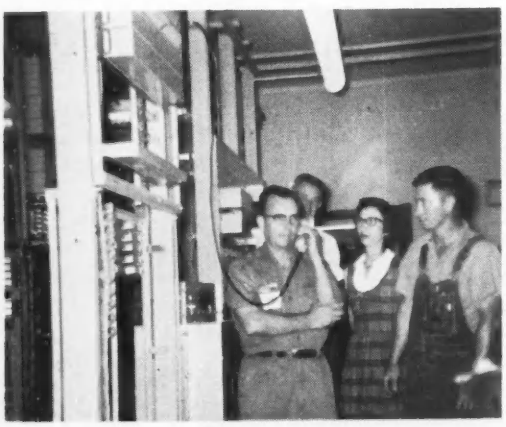
Because New Prague is a considerable distance from headquarters at Blue Earth, Mr. Eckles selected as local manager a man whom he had trained with the parent organization — Mr. Lyle Crawford. Mr. Crawford remembers that there were only 200 telephones when he was sent to New Prague about fifteen years ago. This community — about halfway on a direct line between Minneapolis and Mankato — is known for dairying, stock breeding, and flour milling.

In bringing the advantages of completely modern telephone service to New Prague, Mr. Eckles has completed an improvement program covering the years since he originally acquired this property. Now his other customers — nearer headquarters — will receive these same advantages in the near future.



Mr. Eldon Eckles, president of the Blue Earth (Minn.) Valley Telephone Company (foreground), and Lyle Crawford, local manager at New Prague. Just after cutover, Mr. Crawford spent 6 weeks in Rochester at the XY Training School.

Good telephone neighbors help make cutover a success



Everybody helped, including the mayor of Anderson, Walter Sellers, left; Bill Miller, Springfield, Mo.; Mrs. Rhine and Victor Rhine.

Good telephone neighbors are always ready to "lend a helping hand." This was especially true recently when Victor Rhine, manager of the McDonald County Telephone, converted the Anderson, Missouri, exchange to XY Dial.

His neighbors, representing Independent Telephony in the Southwestern corner of Missouri, in the highest tradition, helped Victor Rhine and his wife make the cutover of the 250-line, 600-terminal office a success.

Among those assisting were Walter Mitchell, manager of the Seneca (Missouri) Telephone Company, and his staff; Fred Cartwright, manager of the Noel (Missouri) Telephone Company, and his staff; and Calvin Herrin, lineman at Anderson. Also doing their share were Jack Sanders and Bill Miller of the Bell company; and for Stromberg-Carlson, E. R. Sears, Jr., sales representative, and Elmo Landry, service engineer.

When telephone neighbors get together . . . Victor Rhine, left, of the McDonald Telephone Company, and Walter Mitchell, Seneca (Missouri) Telephone Company.

Fred Cartwright, manager of the Noel (Missouri) Telephone Company, and his lineman, C. W. Brubacher, do their share at the Anderson cutover.

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By JOHN G. REYNOLDS

"Mass Call" Service

YUKON 3 is a New York telephone exchange that had only one function in November and December: It was a direct line to Santa Claus at the North Pole and children used it at the rate of 75,000 calls every day. They dialed YUkon 3-2121. Santa Claus came on with a booming laugh. He said: "Hello there! This is your friend, Santa Claus, at the North Pole. I'm busy making toys for you for Christmas." He ran off broad categories of things in his workshop, went into a subtle commercial and hung up with the rain-barrel laugh.

Actually, YUkon 3 doesn't exist as a telephone exchange. It is a dark chamber in the New York Telephone Co. office at 104 Broad Street. The laughing Santa Claus was a recording made up for a Philadelphia advertising company that offers what the telephone people call "mass service," the use of telephones for recorded advertising.

The telephone company's midtown sales office on the 16th floor at 165 West Forty-sixth St. had the Santa Claus greeting on demonstration in its mass-call exhibit there.

Company salesmen told visitors of other uses for the device. Five churches in the city have 24-hour dial-a-prayer service for the heartsick and the weary. The recorded prayers are changed almost every day, in some cases several times a day.

The Agricultural Department of the Nassau County Extension Service, a non-profit state unit, uses the mass-call to dispense information on care of lawns, trees, flower beds and how to put down garden insect pests. It is robot adviser to all manner of husbandmen.

The Home Demonstration Service of the same state body has news on food-buying, meal-planning, keeping foods fresh. It gives counsel on food bargains — tells what fruits, meats or vegetables are in good supply and reasonably priced.

A sporting goods store in Manhattan uses the recorded telephone message to give tips on where salt, or fresh-water, fish are running best. Fresh-water anglers call one number; deep-water men call another.

Two bright young men up in White Plains in Westchester are working right now on another mass-call set-up. They will offer free information on "best buys" in various local establishments. This will be bait to lure shoppers to stores that subscribe to the young men's service.

In New York the popularity of the mass call is spreading so fast telephone people won't attempt to predict its future. But on-the-scene observers had this comment last month — "We could be headed into the robot era faster than most think . . . . "

Time Out For Work

FROM Los Angeles comes a suggestion that a swimming pool break be added to the coffee breaks.

A man named Everett Landon predicted: "The swimming pool break will one day take its place alongside the coffee break in American industry." Landon, you will not be astonished to learn, was speaking as general chairman of the National Swimming Pool Institute convention.

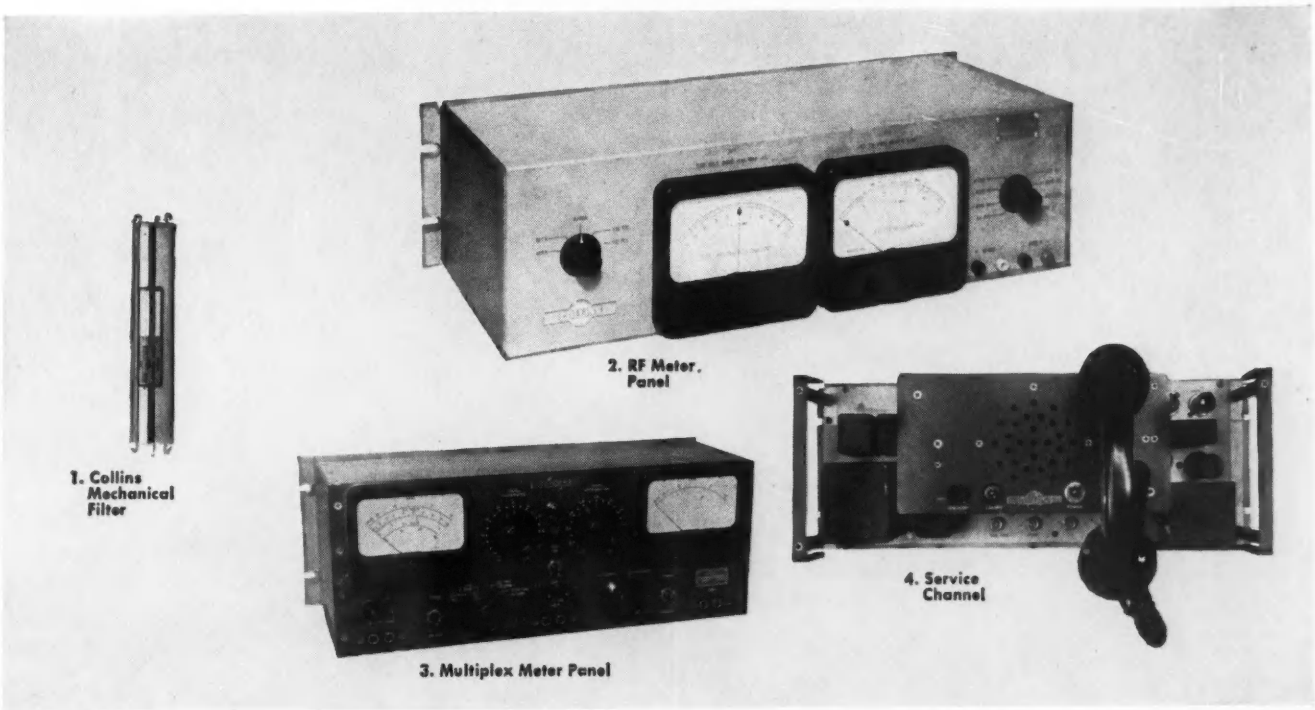
Swimming pools, he said, already are being built in some factories, so maybe the nation's workers really will presently be taking a refreshing swim each morning and afternoon before relaxing with their coffee.

What with the clothes-changing and everything, this will keep people pretty busy. There should still be time, though, for them to put in a few licks at the job, and this period will come to be known, we are sure, as the work break.

"No, I don't want a straight line . . . I want to know what's going on in my neighborhood!"

Here are some Collins Microwave features that can cut your maintenance costs

The electrical and mechanical design of Collins Microwave systems insures low maintenance costs and reduces circuit outages to the absolute minimum



1. Single sideband suppressed carrier multiplexing is simplified and made more economical by the use of Collins' Mechanical Filter. The steep skirt attenuation prevents co-channel crosstalk. The filter is a small, permanently tuned, hermetically sealed unit. Deterioration of system performance by coil aging, humidity, and other detrimental effects is eliminated.

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3. A test panel for the multiplex equipment provides metering facilities for level measuring and setting, and general purpose audio measurements.

4. The Collins Microwave service channel provides simultaneous voice transmission and reception, with signaling, among all stations in a system on a party line basis. Direct modulation of the microwave equipment is employed without using the carrier facilities.

Collins Engineering staff at your service

Our engineers will assist you in evaluating, planning and installing Microwave equipment. Write or call today for further information on Collins Microwave Equipment: Texas Division Sales, Collins Radio Company, 1930 Hi-Line Drive, Dallas 7, Texas.

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